MOP0205051C2

Service Manual

Microwave Oven

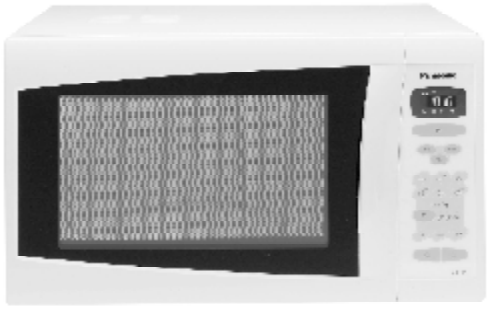
NN-E442WBBPQ / NN-E442WBEPG

27L

White

BPQ for the United Kingdom

EPG for Continental Europe



SPECIFICATIONS

Specifications

Power Requirement	230 Volts AC 50 Hz 1,250 Watts (5.0 A) Single phase, 3 wire grounded
Power Output	900 Watts full microwave power (IEC60705)
Microwave Frequency	2,450 MHz
Magnetron	2M214-39F, 2M254J
Timer	0 ~ 99 min. 59 sec.
Outside Dimensions	530 (W) x 322 (H) x 404 (D) mm
Cavity Dimensions	348 (W) x 222 (H) x 366 (D) mm
Net Weight	17 kg (approx.)
Shipping weight	19 kg (approx.)
Specifications subject to change without notice.	

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

1. Safety Precautions

This device is to be serviced only by properly qualified service personnel.
Consult the service manual for proper service procedures to assure continued safety operation and for precautions to be taken to avoid possible exposure to excessive microwave energy.

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

A) Do not operate or allow the oven to be operated with the door open.

B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary; (1) interlock operation, (2) proper door closing, (3) seal and sealing surfaces (arcing, wear, and other damage), (4) damage to or loosening of hinges and latches, (5) evidence of dropping or abuse.

C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity, and connections.

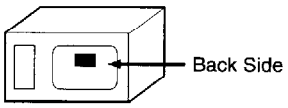
D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

E) A microwave leakage check should be performed on each oven prior to release to the owner.

CAUTION
MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

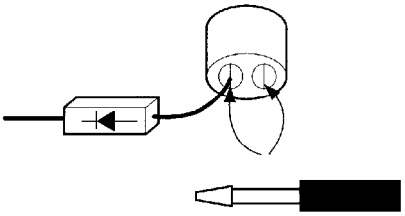
2. Power Level And Accessories

ITEM	DESCRIPTION
Control Complement	Microwave Power for Variable Cooking
	Power level High .....Full power throughout the cooking time Medium.....approx. 70% of Full power Low.....approx. 50% of Full power Defrost.....approx. 30% of Full power Warm.....approx. 10% of Full power
Nameplate Location	
Accessories	Owner's manual Glass tray Rotating Ring
This microwave oven is designed for household use only. It is not recommended for commercial purposes.	

3. Cautions

Unlike other appliances, the microwave oven is high-voltage and high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

- DO NOT operate on a 2-wire extension cord during repair and use.
- NEVER TOUCH any oven components or wiring during operation.
- BEFORE TOUCHING any parts of the oven, always remove the power plug from the outlet.
- For about 30 seconds after the oven stops, an electric charge remains in the high voltage capacitor. When replacing or checking, you must discharge the high voltage capacitor by shorting across the two terminals with an insulated screwdriver.

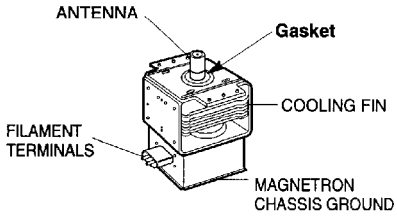


- Remove your watches whenever working close to or replacing the Magnetron.
- DO NOT touch any parts of the control panel circuit. A resulting static electric discharge may damage this P.C.B.
- NEVER operate the oven with no load.
- NEVER injure the door seal and front plate of the oven cavity.
- NEVER put iron tools on the magnetron.
- NEVER put anything into the latch hole and the interlock switches area.

MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating device if it is improperly used or connection. All input and output microwave connections, waveguide, flange and gasket must be secure never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

- Proper operation of the microwave oven requires that the magnetron be assembled to the waveguide and cavity. Never operate the magnetron unless it is properly installed.
- **Be sure that the magnetron gasket is properly installed around the dome of the tube whenever installing the magnetron.**



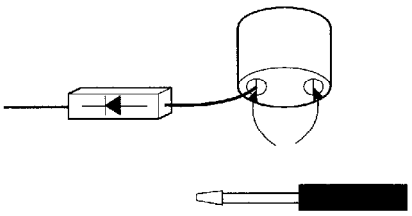
MAGNETRON

THE OVEN IS TO BE SERVICED ONLY BY PROPERLY QUALIFIED SERVICE PERSONNEL.

4. VAROITUKSET (Finish)

Toisin kuin muissa laitteissa, mikroaaltouunissa on korkea jännite ja suuri virta. Vaikka se ei tavanomaisessa käytössä ole vaarallinen, on korjaustöiden aikana oltava erittäin huolellinen.

- ÄLÄ käytä kaksijohdinjatkojohtoa uunin korjauksen ja käytön aikana.
- ÄLÄ KOSKAAN kosketa uunin komponentteja tai johtoja käytön aikana.
- ENNEN KUIN KOSKET mihinkään uunin osaan, irrota aina virtajohto pistokkeesta
- Uunin korkeajännitekondensaattorissa on sähköinen lataus noin 30 sekunnin ajan uunin käytön jälkeen. Kun vaihdat osia tai teet tarkistuksia, korkeajännitekondensaattorin lataus täytyy purkaa oikosulkemalla kaksi liitosnapaa eristetyllä ruuvimeisselillä.

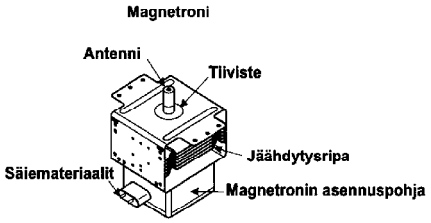


- Riisu aina rannekellosi, kun työskentelet magnetronin lähellä tai kun vaihdat sitä.
- ÄLÄ KOSKAAN käytä uunia tyhjänä
- ÄLÄ KOSKAAN vahingoita oven tiivistettä ja uunin aukon etulevyä
- ÄLÄ KOSKAAN laita rautatyökaluja magnetronin päälle
- ÄLÄ KOSKAAN laita mitään salvan reiän tai lukituksen sisälle.

MIKROAALTOSÄTEILY

Henkilökunta ei saa joutua alttiiksi magnetronista tai muista mikroaaltoja kehittävistä laitteista syntyvälle mikroaaltoenergialle, jos laitetta käytetään väärin tai jos se on väärin kytketty. Kaikki mikroaaltojen sisääntulo- ja lähtöliitännät, aaltojohdot, laipat ja tiivisteet tulee varmistaa. Älä koskaan käytä laitetta ilman mikroaaltoenergiaa absorboivaa kuormitusta. Älä koskaan katso avoimeen aaltojohtoon tai antenniin, kun laite on virroitettu.

- Mikroaaltouunin asianmukainen toiminta edellyttää, että magnetroni on asennettu aaltojohtoon ja onteloon. Älä koskaan käytä magnetronia, jos se ei ole oikein asennettu.
- **Aina kun asennat magnetronia, varmista, että magnetronin tiiviste on asennettu oikein putken kuvun ympärille.**

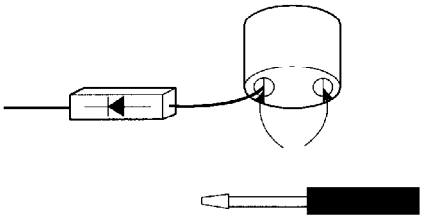


AINOASTAAN PÄTEVÄ HUOLTOHENKILÖKUNTA SAA HUOLTAA UUNIN.

5. VARNING (Swedish)

En mikrovågsugn är till skillnad från andra apparater en högspännings- och starkströmsapparat. Även om den är ofarlig vid vardagsbruk, bör man vara extremt försiktig när man reparerar den.

- Apparaten får INTE anslutas med en tvåtrådig förlängningssladd vid reparation och användning.
- VIDRÖR ALDRIG ugnens delar eller sladdar när den är i bruk.
- Tag alltid ut nätsladden från vägguttaget INNAN DU VIDRÖR ugnens delar.
- En elektrisk laddning finns kvar i högspänningskondensatorn cirka 30 sekunder efter att ugnen har stannat. När högspänningskondensatorn byts ut eller kontrolleras, måste den laddas ur genom att de två anslutningar kortsluts med en isolerad skruvmejsel.

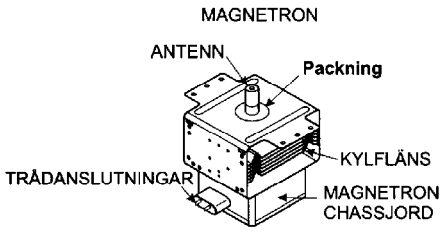


- Ta alltid av ditt armbandsur när du arbetar nära eller ska byta ut magnetronen.
- Starta ALDRIG ugnen när den är tom.
- Skada ALDRIG luckans tätning och ugnsutrymmets frontplatta.
- Lägg ALDRIG järnverktyg på magnetronen.
- Peta ALDRIG in något i spärrhålet eller i området runt säkerhetsbrytarna.

MIKROVÅGSSTRÅLNING

Personalen får inte utsättas för mikrovågsenergin som kan stråla ut från magnetronen eller annan mikrovågsgenererande apparat om den är felaktigt använd eller ansluten. Ingående och utgående mikrovågsanslutningar, vågledare, fläns och packning måste sitta fast ordentligt. Använd aldrig apparaten utan att ett mikrovågsenergiabsorberande material har installerats. Titta aldrig in i en öppen vågledare eller antenn medan apparaten används.

- För att mikrovågsugnen ska fungera ordentligt krävs det att magnetronen monteras till vågledaren och håligheten. Använd aldrig magnetronen om den inte är korrekt installerad.
- **Se till att magnetronens packning sitter ordentligt runt rörets välvning när magnetronen installeras.**

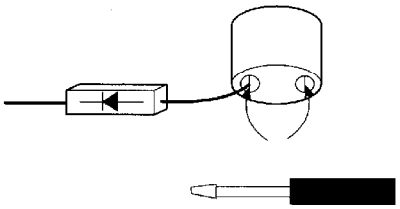


UGNEN FÅR ENDAST REPARERAS AV EN KVALIFICERAD REPARATÖR.

6. ADVARSLER (Norweigen)

I motsetning til andre apparater er mikrobølgeovnen en innretning med høyspenning og strøm. Til vanlig bruk er den ufarlig, men du må være svært forsiktighvis du skal reparere den.

- Du må ALDRI bruke en totråds skjøteledning i forbindelse med vanlig bruk eller under reparasjon.
- Du må ALDRI ta på noen av ovnens deler eller ledninger når den er i bruk..
- Du må ALLTID trekke ut stikkontakten hvis du skal ta på noen av ovnens deler.
- I ca. 30 sekunder etter at ovnen stanser, er det en elektrisk ladning i høyspenningskondensatoren. Når du skal bytte ut eller kontrollere høyspenningskondensatoren, må du utlade den ved å kortslutte de to koplingspunktene med et isolert skrujern.

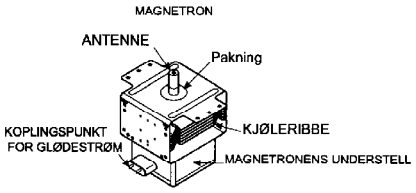


- Du må ta av deg klokken når du arbeider i nærheten av eller bytter ut magnetronen.
- Du må ALDRI starte ovnen når den er tom.
- Du må IKKE ødelegge dørforseglingen eller ovnrommets frontplate.
- Du må ALDRI la jernverktøy komme i kontakt med magnetronen.
- Du må ALDRI putte noe inni sperrehullet eller området rundt sikkerhetsbryterne.

MIKROBØLGESTRÅLING

Personalet skal ikke utsettes for mikrobølgeenergi som sendes ut framagnetronen eller andre innretninger som danner mikrobølger, somikke brukes på riktig måte eller er feil installert. Alle inn- og uttak tilmikrobølgekoplinger, bølgeledere, flenser og pakninger må sikres. Dumå aldri bruke innretningen uten at den er koplet til etmikrobølgeabsorberende element. Du må aldri se inn i en åpenbølgeleder eller antenne når apparatet er i bruk.

- For at mikrobølgeovnen skal brukes på riktig måte, må magnetronen monteres til bølgelederen og innsiden av ovnen. Du må aldri bruke magnetronen hvis den ikke er ordentlig installert.
- Kontroller at magnetronpakningen installeres riktig rundt hodet på røret når du installerer magnetronen.

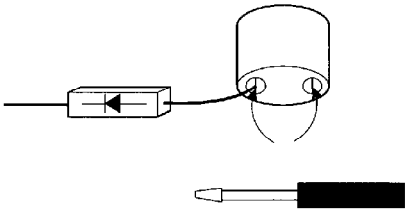


KUN KVALIFISERT SERVICEPERSONALE KAN UTFØRE SERVICE PÅ MIKROBØLGEOVNEN.

7. FORSIGTIGHEDSREGLER(Danish)

I modsætning til andre anordninger har mikrobølgeovnen høj spænding og høj ladning. Selvom der ikke er nogen fare ved almindelig brug, skal du være yderst forsigtig i forbindelse med reparation.

- BRUG ALDRIG en 2-tråds forlængerledning i forbindelse med reparation og brug.
- RØR ALDRIG ved ovnkomponenter eller ledninger under brug.
- FØR DU RØRER VED nogen af ovnens dele, skal du altid tage stikket ud af stikkontakten.
- I ca. 30 sekunder efter ovnen stopper, forbliver der en elektrisk ladning i højspændingskondensatoren. Når du udskifter dele eller foretager kontrol, skal du aflade højspændingskondensatoren ved at kortslutte de to klemmer med en isoleret skruetrækker.

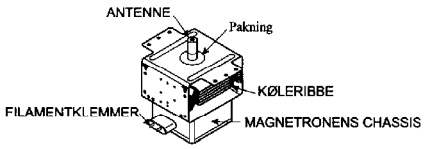


- Fjern dine ure, når du arbejder i nærheden af magnetronen eller udskifter den.
- Brug ALDRIG ovnen uden belastning.
- Sørg for ALDRIG at beskadige ovnrummets dørtætning og forplade.
- Anbring ALDRIG jernværktøj på magnetronen.
- Anbring ALDRIG noget i låsens hul eller i området omkring sikkerhedsafbryderne.

MIKROBØLGESTRÅLING

Personale må ikke udsættes for den mikrobølgeenergi, der kan udsendes fra magnetronen eller andet mikrobølgeudviklende udstyr, hvis det bruges forkert eller ikke er tilsluttet korrekt. Alle ind- og udgående mikrobølgetilslutninger, bølgeleder, flange og pakning skal sikres. Brug aldrig enheden, hvis der ikke er fastgjort en belastning, der absorberer mikrobølgeenergi. Se aldrig ind i en åben bølgeleder eller antenne, når enheden er aktiveret.

- Korrekt brug af mikrobølgeovnen kræver, at magnetronen forbindes til bølgelederen og ovnrummet. Brug aldrig magnetronen, hvis den ikke er installeret korrekt.
- **Sørg for, at magnetronpakningen altid er installeret korrekt omkring rørets hoved, når du installerer magnetronen.**



DER MÅ KUN UDFØRES SERVICE PÅ OVNEN AF KORREKT KVALIFICERET SERVICEPERSONALE.

8. Installations

BEFORE YOU BEGIN, READ THE FOLLOWING INSTRUCTIONS COMPLETELY AND CAREFULLY.

INSTALLING

1. Empty the microwave oven and clean inside it with a soft, damp cloth. Check for damage such as misaligned door, damage around the door or dents inside the cavity or on the exterior.

2. Put the oven on a counter, table, or shelf that is strong enough to hold the oven and the food and utensils you put in it. (The control panel side of the oven is the heavy side. Use care when handling.)

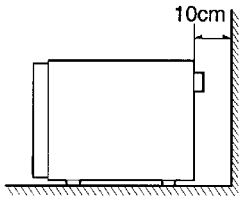
3. Do not block the vent and the air intake openings. Blocking vent or air intake openings can cause damage to the oven and poor cooking results. Make sure the microwave oven legs are in place to ensure proper air flow.

4. The oven should not be installed in any area where heat and steam are generated, because they may damage the electronic or mechanical parts of the unit.
   Do not install the oven next to a conventional surface unit or above a conventional wall oven.

5. Use microwave oven in an ambient temperature less than 104°F(40°C).

6. Place the microwave oven on a sturdy and flat surface at least 10 cm(4 inches) from the wall.

7. Place the microwave oven as far away as possible from TV, RADIO, COMPUTER, etc., to prevent interference.



EARTHING INSTRUCTIONS

This microwave oven is designed to be used in a fully earthed condition.
It is imperative, therefore, to make sure it is properly earthed before servicing

WARNING-
THIS APPLIANCE
MUST BE EARTHED

IMPORTANT

The wires in this mains lead are colored in accordance with the following code:

Green-and-yellow:	**Earth**
Blue:	**Neutral**
Brown:	**Live**

As the colors of the wires in the mains lead of this appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows.

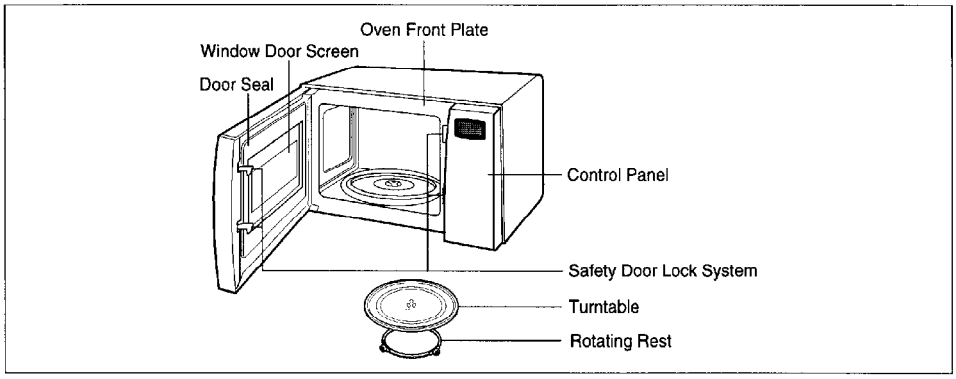
The wire which is colored **green-and-yellow** must be connected to the terminal in the plug which is marked with the letter **E** or by the **earth symbol** (⏚) or colored **green** or **green-and-yellow**.

The wire which is colored **blue** must be connected to the terminal in the plug which is marked with the letter **N** or colored **black**.

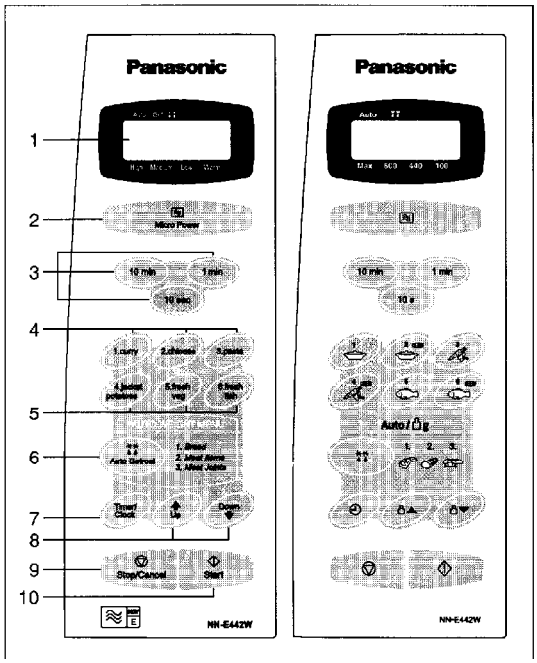
The wire which is colored **brown** must be connected to the terminal in the plug which is marked with the letter **L** or colored **red**.

9. Operating Instructions

FEATURES



CONTROL PANEL

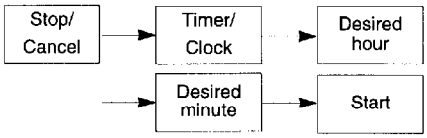


1. **Display Window**
2. **Microwave Power Levels**
3. **Time Pads**
4. **Auto Weight Reheat Programs**
5. **Auto Weight Cook Programs**
6. **Auto Weight Defrost Pad**
7. **Timer/Clock Pad**
8. **Weight selection Pads**
9. **Stop/Cancel Pad:**
   Before cooking:
   one press clears your instructions.
   During cooking:
   one press temporarily stops the cooking program. Another press cancels all your instructions and the time of day will appears in the display.
10. **Start Pad**

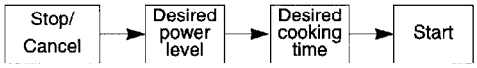
10. Operating Sequence

The following is a description of component functions during oven operation.

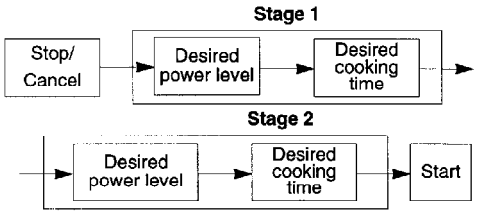
1. SETTING THE CLOCK



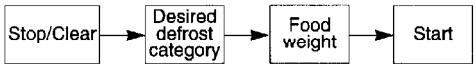
2. MICROWAVE COOKING



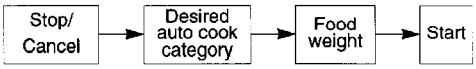
3. MULTI STAGE COOKING



4. AUTO WEIGHT DEFROST



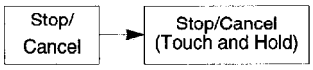
5. AUTO COOK



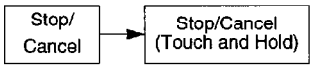
6. CHILD LOCK

This oven has a CHILD LOCK feature.

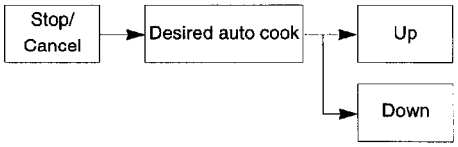
To Set CHILD LOCK



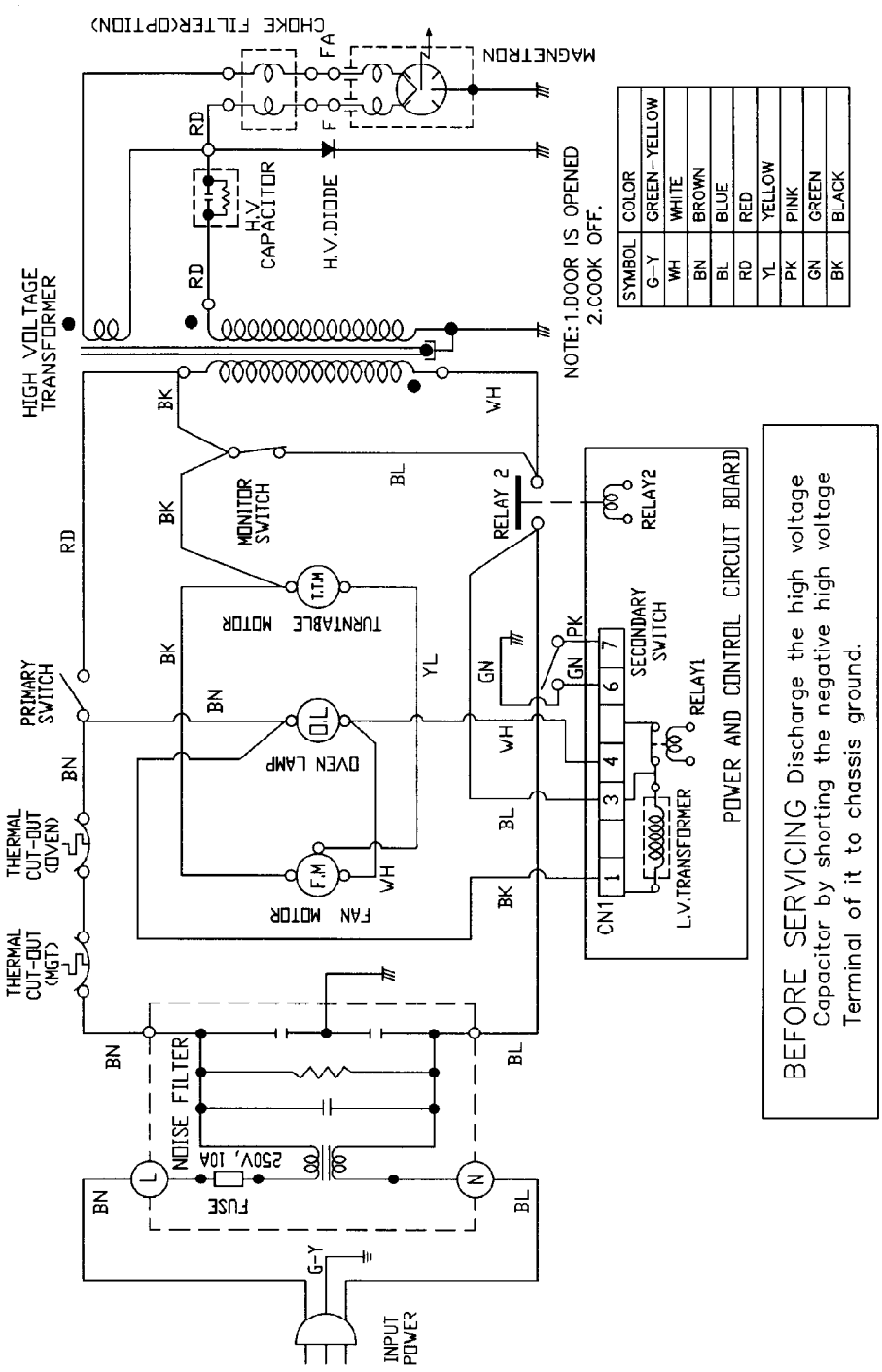
To Cancel CHILD LOCK



7. MORE AND LESS



11. Schematic Diagram



12. Circuit Description

GENERAL DETAILS

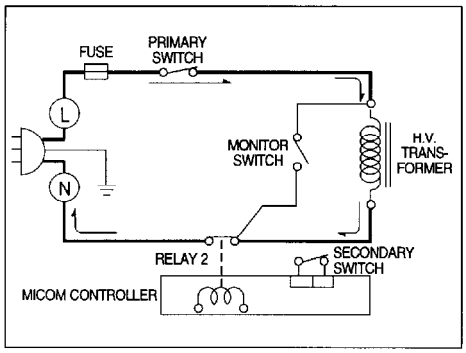
- The low voltage transformer supplies the necessary voltage to the micom controller when power cord is plugged in.
- When the door is closed, the primary switch is ON, the secondary switch is ON, and the monitor switch opens (contact COM and NO).

WHEN SELECTING COOKING POWER LEVEL AND TIME

- The micom controller memorizes the function you set.
- The time you set appears in the display window.
- Each indicator light turns on to indicate that the stage has been set.

WHEN TOUCHING THE START PAD

- The coil of the relay is energized by the micom controller.
- Power input is supplied to the high voltage transformer through the fuse to the primary switch and relay 2.
- Turntable rotates.



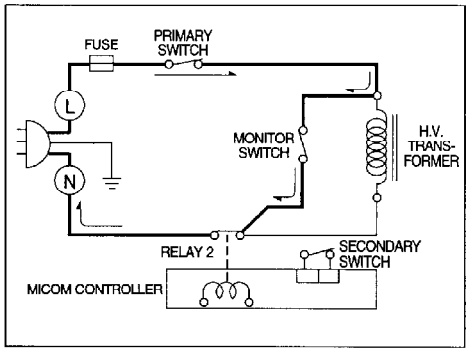
- The fan motor rotates and cools the magnetron by blowing the air (coming from the intake on the baseplate).
- The air is also directed into the oven to exhaust the vapor in the oven through the upper plate.
- Cooking time starts counting down.
- 3.2 volts AC is generated from the filament winding of the high voltage transformer. This 3.2 volts is applied to the magnetron to heat the magnetron filament through two noise-preventing choke coils.
- A high voltage of approximately 2100 volts AC is generated in the secondary of the high voltage transformer which is increased by the action of the high voltage diode and charging of the high voltage capacitor.
- The negative 4,000 Volts DC is applied to the filament of the magnetron.

WHEN THE OVEN IS SET AT ANY LEVEL EXCEPT MAXIMUM.

- The micom controller controls the ON-OFF time of relay 2 by the applied signal to vary the average output power of microwave oven as POWER LEVEL. (refer to page 1-1)
- One complete cycle of relay 2 is 22 seconds.

WHEN THE DOOR IS OPENED DURING COOKING

- Both the primary switch and relay 2 are cut off primary winding voltage of the high voltage transformer.
- ON-OFF of relay 2 is coupled electrically with opening and closing of the secondary switch.
- When the door is opened, the secondary switch is opened and when the door is closed, the secondary switch is closed.
- The cooking time stops counting down.
- Relay stops functioning.
- As the door is opened, if the contact of primary switch and relay 2 and/or secondary switch fails to open, the fuse opens due to the large current surge caused by the monitor switch activation, which in turn stops magnetron oscillation.



13. Service Information

13.1. Tools And Measuring Instruments

NECESSARY TOOLS

Tools normally used for TV servicing are sufficient. Standard tools are listed below.

- Diagonal pliers
- Long nose pliers
- Phillips screwdriver
- Flat blade screwdriver
- Wrench (size 5mm)
- Nutdriver (size 5mm)
- Adjustable wrench
- Soldering iron
- Solder
- Vinyl insulation tape
- Polishing cloth

NECESSARY MEASURING INSTRUMENTS

- TESTER(VOLTS-DC, AC., Ohmmeter)
- Microwave survey meter
  - Holaday HI-1500
    HI-1501
  - Narda 8100
    8200
- Inch scale
- 600 cc non conductive material beaker (glass or plastic), inside diameter: approx. 8.5 cm($3^1/_2$ in.)
- Cylindrical and made of borosilicate glass vessel.
  max. thickness: 3 mm
  outside diameter: approx. 190mm
  height: approx. 90mm
- Glass thermometer: 100°C or 212°F (1 deg scale)

13.2. Microwave Leakage

CAUTIONS

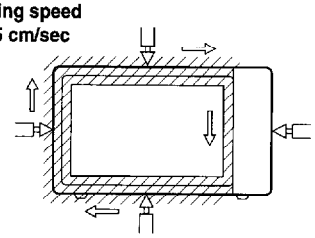
- **Be sure to check microwave leakage prior to servicing the oven if the oven is operative prior to servicing.**
- **The service personnel should inform the manufacture importer, or assembler of any certified oven unit found to have a microwave emission level in excess of 5 mW/cm²** and should repair any unit found to have excessive emission levels at no cost to the owner and should ascertain the cause of the excessive leakage. The service personnel should instruct the owner not to use the unit until the oven has been brought into compliance.
- **If the oven operates with the door open, the service personnel should:**
  - Tell the user not to operate the oven.
  - Contact the manufacturer.
- The service personnel should check all surface and vent openings for microwave leakage.
- Check for microwave leakage after every servicing. The power density of the microwave radiation leakage emitted by the microwave oven should not exceed 5 mW/cm². Always start measuring of an unknown field to assure safety for operating personnel from radiation leakage.

MEASURING MICROWAVE ENERGY LEAKAGE

- **Pour 275±15 cc of 20±5°C(68±9°F) water in a beaker which is graduated to 600 cc, and place the beaker on the center of the turntable.**
- **Set the energy leakage monitor to 2,450 MHz and use it following the manufacturer's recommended test procedure to assure correct result.**
- **When measuring the leakage, always use the 2-inch (5 cm) spacer supplied with the probe.**
- **Operate the oven at its maximum output.**
- **Measure the microwave radiation using and electromagnetic radiation monitor by holding the probe perpendicular to the surface being measured**

Move probe along shaded area

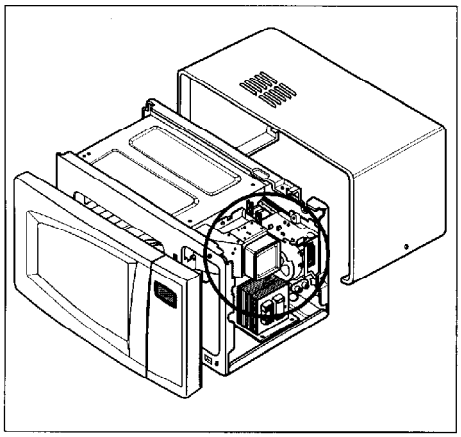
Probe scanning speed
Less than 2.5 cm/sec
(1in/sec)



MEASUREMENT WITH OUTER CASE REMOVED

- When you replace the magnetron, measure for microwave energy leakage before the outer case is installed and after all necessary components are replaced or adjusted.
  Special care should be taken in measuring the following parts. (Circled area of below Fig.)
  - Around the magnetron
  - The waveguide

WARNING : AVOID CONTACTING ANY HIGH VOLTAGE PARTS (Magnetron, H.V. Transformer, H.V. Capacitor, H.V. Cable Ass'y)



MEASUREMENT WITH A FULLY ASSEMBLED OVEN

- After all components, including the outer case, are fully assembled, measure for microwave energy leakage around the door viewing window, the exhaust opening, and air inlet openings.
- Microwave energy leakage must not exceed the values prescribed below.

NOTE: Leakage with the outer case removedless than 5 mW/cm.sq. Leakage for a fully assembled oven (Before the latch switch (primary) is interrupted) with the door in a slightly opened position-less than 2 mW/cm.sq.

NOTES WHEN MEASURING

- Do not exceed meter full scale deflection.
- The test probe must be removed no faster than 1 inch/sec (2.5 cm/sec) along the shaded area, otherwise a false reading may result.
- The test probe must be held with the grip portion of the handle.
  A false reading may result if the operator's hand is between the handle and the probe.
- When testing near a corner of the door, keep the probe perpendicular to the surface making sure the probe horizontally along the oven surface, this may possibly cause probe damage.

RECORD KEEPING AND NOTIFICATION AFTER MEASUREMENT

- After adjustment and repair of any microwave energy interruption or microwave energy blocking device, record the measured values for future reference. Also enter the information on the service invoice.
- The microwave energy leakage should not be more than 4 mW/cm.sq. after determining that all parts are in good condition, functioning properly and genuine replacement parts which are listed in this manual have been used.
- At least once a year, have the electromagnetic energy leakage monitor checked for calibration by its manufacturer.

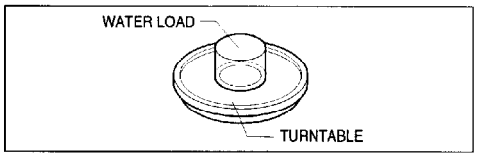
13.3. Measurement Of Microwave Power Output

- Microwave power output measurement is made with the microwave oven supplied at its rated voltage and operated at its maximum microwave power setting with a load of (1000±5) g of potable water.
- The water is contained in a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190mm.
- The oven and the empty vessel are at ambient temperature prior to the start of the test.
- The initial temperature (T1) of the water is (10±2)°C It is measured immediately before the water is added to the vessel. After addition of the water to the vessel, the load is immediately placed on the center of the turntable which is in the lowest position and the microwave power switched on.
- The time T for the temperature of the water to rise by a value Δ T of (10±2)°K is measured, where T is the time in seconds and ΔT is the temperature rise. The initial and final water temperatures are selected so that the maximum difference between the final water temperature and the ambient temperature is 5°K.
- The microwave power output P in watts is calculated from the following formula :

$$P = \frac{4187 \times (\Delta T) + 0.88 \times (T_2 - T_0) \times M}{T}$$

  - T_2: Temperature after heating
  - T_0: Temperature of bowl
  - M: Weight of bowl

  is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included. (about 3 sec)
- The water is stirred to equalize temperature throughout the vessel, prior to measuring the final water temperature.
- Stirring devices and measuring instruments are selected in order to minimize addition or removal of heat.



13.4. Disassembly And Adjustment

A. OUTER CASE REMOVAL

1) Disconnect the power supply cord from the outlet.
2) Remove the screws from the rear and along side edges of the case.
   The outer case must be moved backward to be lifted off.

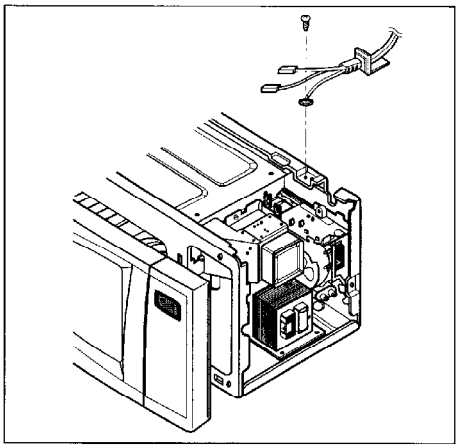
B. POWER SUPPLY CORD

1) Remove the outer case.
2) Disconnect two terminals, and remove one screw of the earth terminal.

CAUTION: DISCHARGE THE HIGH VOLTAGE CAPACITOR BEFORE SERVICING
(refer to page 2-1)

C. CONTROL PANEL ASSEMBLY

1) Disconnect the leadwire from the PCB SUB ASS'Y
2) Remove the screws for the earth and securing the control panel.
3) Lift control panel ASS'Y from the oven by the tab unhooked.



D. DOOR GROSS ASSEMBLY REMOVAL

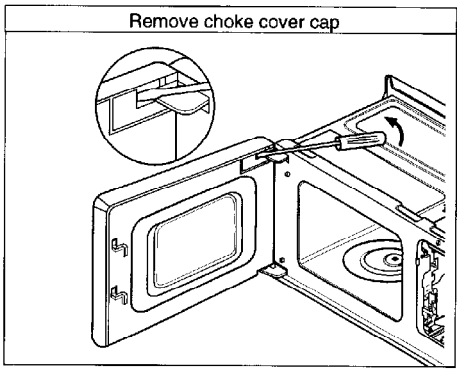
1) Open the door.
2) Remove the choke cover cap very carefully with a flat-blade screwdriver.

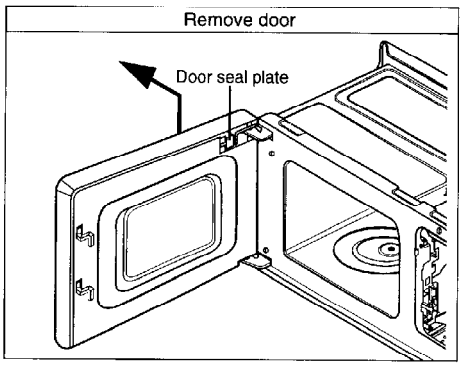
CAUTION : Be careful not to damage door seal plate by screwdriver.

3) Lift up and push the door.

NOTE:

1. After replacing the door, be sure to check that the primary switch, monitor switch, and secondary switch operate normally.
2. After replacing the door, check for microwave energy leakage with a survey meter. Microwave energy must be below the limit of 5 mW/cm. (with a 275 ml water load)
3. When mounting the door assembly to the oven assembly, be sure to adjust the door assembly parallel to the chassis. Also adjust so the door has no play between the inner door surface and oven frame assembly. If the door assembly is not mounted properly, microwaves may leak from the clearance between the door and the oven.





E. HIGH VOLTAGE TRANSFORMER REMOVAL

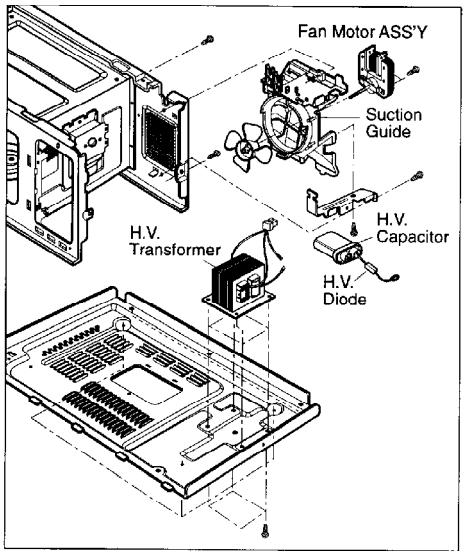
1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from magnetron, high voltage transformer, and capacitor.
3) Remove the screw holding the high voltage transformer to the baseplate.

F. FAN MOTOR ASSEMBLY REMOVAL

1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from fan motor, noise filter and high voltage capacitor.
3) Remove the two screws holding the the suction guide ASS'Y to the oven cavity and remove the high voltage diode earth screw.
4) Remove the screw of the capacitor bracket.
5) Remove the two screws holding the fan motor ASS'Y to the suction guide ASS'Y.

G. HIGH VOLTAGE CAPACITOR AND DIODE REMOVAL

1) Discharge the high voltage capacitor.
2) Disconnect the leadwire from fan motor, noise filter and high voltage capacitor.
3) Remove the screw holding the suction guide ASS'Y to the oven cavity and remove the high voltage diode earth screw.
4) Remove the screw holding the high voltage capacitor bracket.



H. AIR DUCT ASSEMBLY REMOVAL

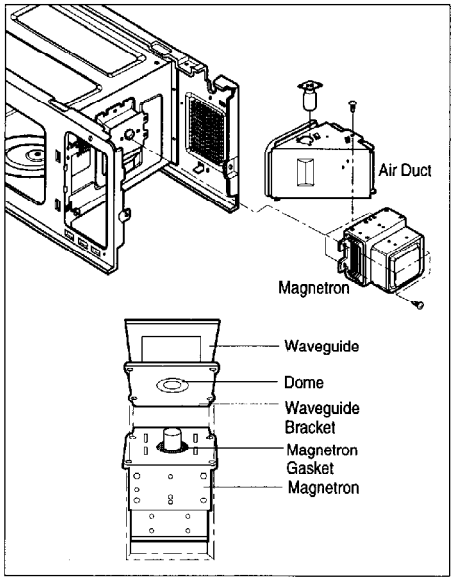
1) Disconnect the leadwire from the lamp.
2) Remove the mounting screw to the magnetron.

I. MAGNETRON REMOVAL

1) Disconnect the leadwire from the high voltage transformer and high voltage capacitor.
2) Carefully remove the mounting screws holding the magnetron and the waveguide.
3) Remove the magnetron ASS'Y until the tube is clear from the waveguide.

NOTE:

1. When removing the magnetron, make sure its dome does not hit any adjacent parts, or it may be damaged.
2. When replacing the magnetron, be sure to install the magnetron gasket in the correct position and be sure that the gasket is in good condition.
3. After replacing the magnetron, check for microwave leakage with a survey meter around the magnetron. Microwave energy must be below the limit of 5 mW/cm^2. (With a 275 ml. water load). **Make sure that gasket is rigidly attached to the magnetron.** To prevent microwave leakage, tighten the mounting screws properly, making sure there is no gap between the waveguide and the magnetron.



L. REMOVING THE TURNTABLE MOTOR

1) Remove the turntable.
2) Remove the turntable shaft VERY CAREFULLY with a slotted screwdriver.
3) Lay the unit down on its back.
4) Remove the turntable motor cover. The turntable base cover is easily removed by pinching the six parts with a wire cutting.
5) Disconnect the leadwire from the turntable motor terminals.
6) Remove the screw securing the turntable motor to the oven cavity ASS'Y
7) After repairing the motor, rotate the removed turntable motor cover.
8) Fit the turntable motor cover's projecting part to the base plate slit.

NOTE:

1. Remove the wire lead from the turntable motor VERY CAREFULLY.
2. Be sure to grasp the connector, not the wires, when removing.

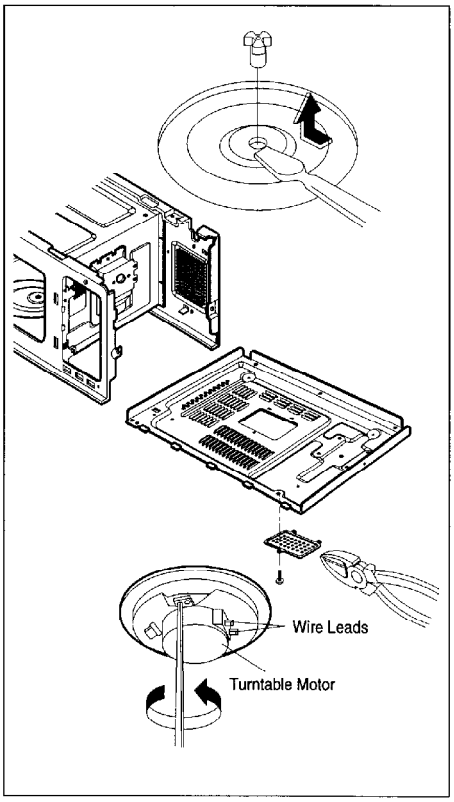
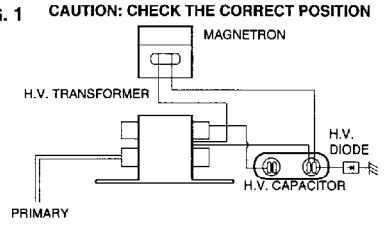
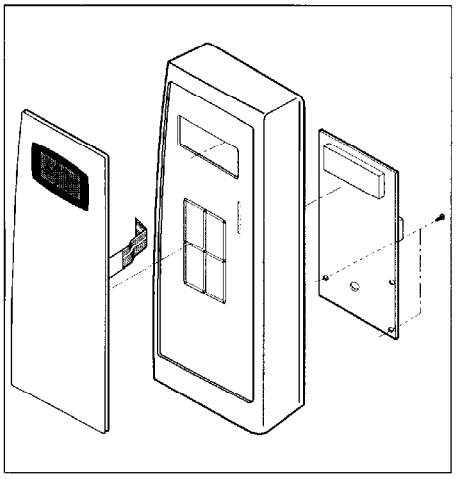


FIG. 1 CAUTION: CHECK THE CORRECT POSITION



K. PCB ASSEMBLY REMOVAL

1) Remove the control panel assembly from the cavity. (Refer to control panel assembly removal on previous page.)
2) Remove screws which hold the PCB SUB ASS'Y to the control panel.
3) Disconnect the flat cable from the PCB SUB ASS'Y and take off the PCB SUB ASS'Y

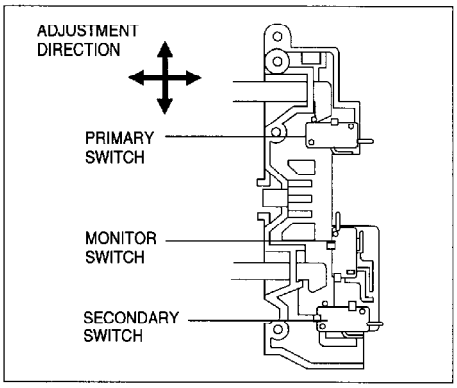


L. INTERLOCK SYSTEM

1) INTERLOCK MECHANISM

The door lock mechanism is a device which has been specially designed to eliminate completely microwave activity when the door is opened during cooking and thus to prevent the danger resulting from the microwave leakage.

2) MOUNTING OF THE PRIMARY/MONITOR/ SECONDARY SWITCHES TO THE LATCH BOARD



3) INSTALLATION AND ADJUSTMENT OF THE LATCH BOARD TO THE OVEN ASSEMBLY

- Mount the latch board to the oven assembly.
- Adjust the latch board in the arrow direction so that oven door will not have any play in it when the door is closed.
- Tighten the mounting screw.
- **Check for play in the door by pulling the door. Door movement should be less than 0.5 mm. (1/64 inch)**

Don't pull the door while making adjustment. Make sure that the latch moves smoothly after adjustment are completed and that the screws are tight. Make sure the primary, monitor, and secondary switches operate properly by following the continuity test procedure.

14. Interlock Continuity Test

WARNING : FOR CONTINUED PROTECTION AGAINST EXCESSIVE RADIATION EMISSION, REPLACE ONLY WITH IDENTICAL REPLACEMENT PARTS.

TYPE NO. SZM-V 16-FA-63 OR VP-533A-OF FOR PRIMARY SWITCH
TYPE NO. SZM-V 16-FA-62 OR VP-532A-OF FOR MONITOR SWITCH
TYPE NO. SZM-V 16-FA-63 OR VP-533A-OF FOR SECONDARY SWITCH

A. PRIMARY INTERLOCK SWITCH TEST

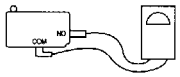
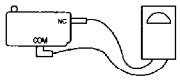
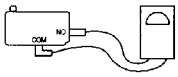
When the door is closed, an audible **click** should be heard at the same time or successively at intervals.
If the latches do not activate the switches when the door is closed, the switches should be a adjusted in accordance with the adjustment procedure. Disconnect the wire lead from the primary switch. Connect the ohmmeter leads to the common (COM) and normally open (NO) terminal of the switch. The meter should indicate an open circuit in the door open condition. When the door is closed, the meter should indicate a closed circuit.
When the primary switch operation is abnormal, make the necessary adjustment or replace the switch only with the same type of switch.

B. SECONDARY INTERLOCK SWITCH TEST

Disconnect the wire lead from the secondary switch.
Connect the ohmmeter leads to the common (COM) and normally open (NO) terminals of the switch. The meter should indicate a open circuit in the door open condition. When the door is closed, meter should indicate an closed circuit. When the secondary switch operation is abnormal, make the necessary adjustment or replace the switch only with the same type of switch.

C. MONITOR SWITCH TEST

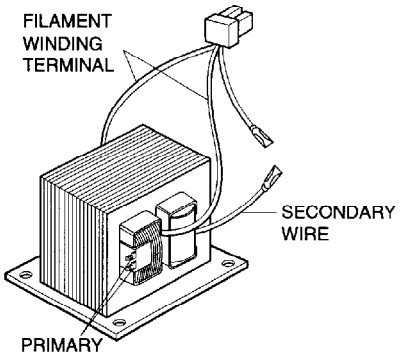
Disconnect the wire lead from the monitor switch. Connect the ohmmeter leads to the common (COM) and normally closed (NC) terminals of the switch. The meter should indicate closed circuit in the door open condition. When the door is closed, meter should indicate an open circuit. When the monitor switch operation is abnormal, replace with the same type of switch.
NOTE: After repairing the door or the interlock system, it is necessary to do this continuity test before operating the oven.

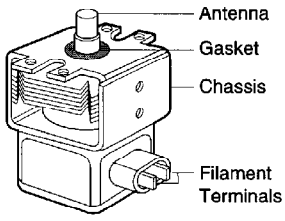
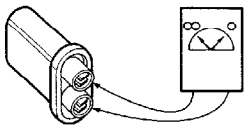
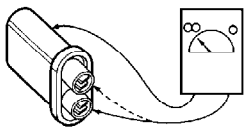
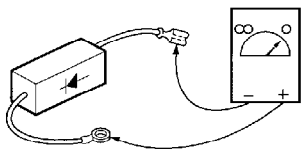
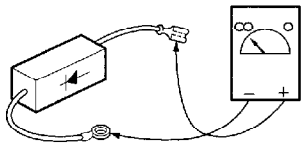
COMPONENTS	TEST PROCEDURE		RESULTS	
SWITCHES (Wire leads removed)	Check for continuity of the switch with an Ohm-meter		Door open	Door closed
	Primary Switch			
	Monitor Switch			
	Secondary Switch			
	NOTE : After checking for the continuity of switches, make sure that are connected correctly.			

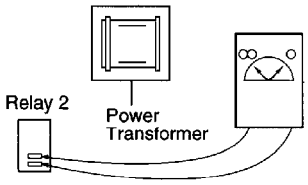
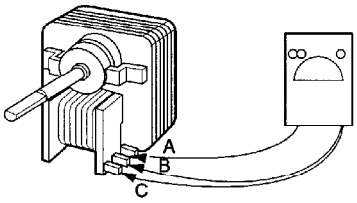
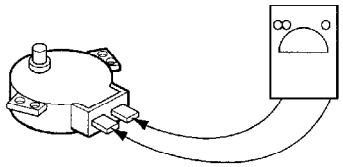
15. Component Test Procedure

CAUTIONS

1. DISCONNECT THE POWER SUPPLY CORD FROM THE OUTLET WHENEVER REMOVING THE OUTER CASE FROM THE UNIT. PROCEED WITH THE TEST ONLY AFTER DISCHARGING THE HIGH VOLTAGE CAPACITOR AND REMOVING THE WIRE LEADS FROM THE PRIMARY WINDING OF THE HIGH VOLTAGE TRANSFORMER. (SEE PAGE 2-1)
2. ALL OPERATIONAL CHECKS WITH MICROWAVE ENERGY MUST BE DONE WITH A LOAD (1 LITER OF WATER IN CONTAINER) IN THE OVEN.

COMPONENTS	TEST PROCEDURE	RESULTS
HIGH VOLTAGE TRANSFORMER (Wire leads removed)	 1. Measure the resistance. (Ohm-meter scale: Rx1) • Primary winding • Secondary winding • Filament winding 2. Measure the resistance. (Ohm-meter scale: Rx1000) • Primary winding to ground • Filament winding to ground	 Approx.: 1.4 Ω Approx.: 90 Ω Less than: 0.1 Ω Normal: ∞ Normal: ∞
MAGNETRON (Wire leads removed)	1. Measure the resistance. (Ohm-meter scale: Rx1) • Between Filament terminal 2. Measure the resistance. (Ohm-meter scale: Rx1000) • Filament to chassis	 Normal: Less than 1 Ω Normal: ∞

COMPONENTS	TEST PROCEDURE	RESULTS
	 NOTE: When testing the magnetron, be sure to install the magnetron gasket in the correct position and be sure that the gasket is in good condition.	
HIGH VOLTAGE CAPACITOR	Measure the resistance. (Ohm-meter scale: Rx1000) • Terminal to terminal. 	Normal: Momentarily indicates several ohms, and then gradually returns to infinite.
	Measure the resistance. (Ohm-meter scale: Rx1000) • Terminal to case. 	Normal: ∞
HIGH VOLTAGE DIODE NOTE : Some inexpensive meters may indicate infinite resistance in both direction.	Measure the continuity (Forward). (Ohm-meter scale: Rx10000) 	Normal: Continuity. Abnormal: ∞
	Measure the continuity (Reverse). (Ohm-meter scale: Rx10000) 	Normal: ∞ Abnormal: Continuity.

<table>
<tr><th>COMPONENTS</th><th>TEST PROCEDURE</th><th>RESULTS</th></tr>
<tr><td>RELAY 2</td><td>Check for continuity of relay 2 with an ohm-meter.
(Remove wire leads from relay 2 and operate the unit.)
 
</td><td>
<table>
<tr><th>POWER LEVEL</th><th>∞ ~ 0</th><th>∞ ~ 0</th></tr>
<tr><td>10%</td><td>5 sec</td><td>17 sec</td></tr>
<tr><td>30%</td><td>9 sec</td><td>13 sec</td></tr>
<tr><td>50%</td><td>13 sec</td><td>9 sec</td></tr>
<tr><td>70%</td><td>17 sec</td><td>5 sec</td></tr>
<tr><td>100%</td><td>22 sec</td><td>0 sec</td></tr>
</table>
</td></tr>
<tr><td>FAN MOTOR
(Wire leads removed)</td><td>Measure the resistance.
(Ohm-meter scale: R x 100)
 
</td><td>Normal:
<table>
<tr><th>A ~ B</th><th>A ~ C</th></tr>
<tr><td>30 ~ 50Ω</td><td>300~500Ω</td></tr>
</table>
Abnormal: ∞ or several Ω</td></tr>
<tr><td>TURNTABLE
MOTOR
(Wire leads removed)</td><td>Measure the resistance.
(Ohm-meter scale: R x 1000)
  </td><td>Normal: Approx. 100~200 Ω
Abnormal: ∞ or several Ω</td></tr>
<tr><td colspan="3">NOTE : • A MICROWAVE LEAKAGE TEST MUST ALWAYS BE PERFORMED WHEN THE UNIT IS SERVICED FOR ANY REASON.
• MAKE SURE THE WIRE LEADS ARE IN THE CORRECT POSITION.
• WHEN REMOVING THE WIRE LEADS FROM THE PARTS, BE SURE TO GRASP THE CONNECTOR, NOT THE WIRES.</td></tr>
</table>

16. Trouble Shooting

16.1. Cautions

WHEN YOU GET A COMPLAINT FROM YOUR CUSTOMER, EVALUATE THE COMPLAINT CAREFULLY. IF THE FOLLOWING SYMPTOMS APPLY, PLEASE INSTRUCT THE CUSTOMER IN THE PROPER USE OF THE MICROWAVE OVEN. THIS CAN ELIMINATE AN UNNECESSARY SERVICE CALL.

CAUTIONS

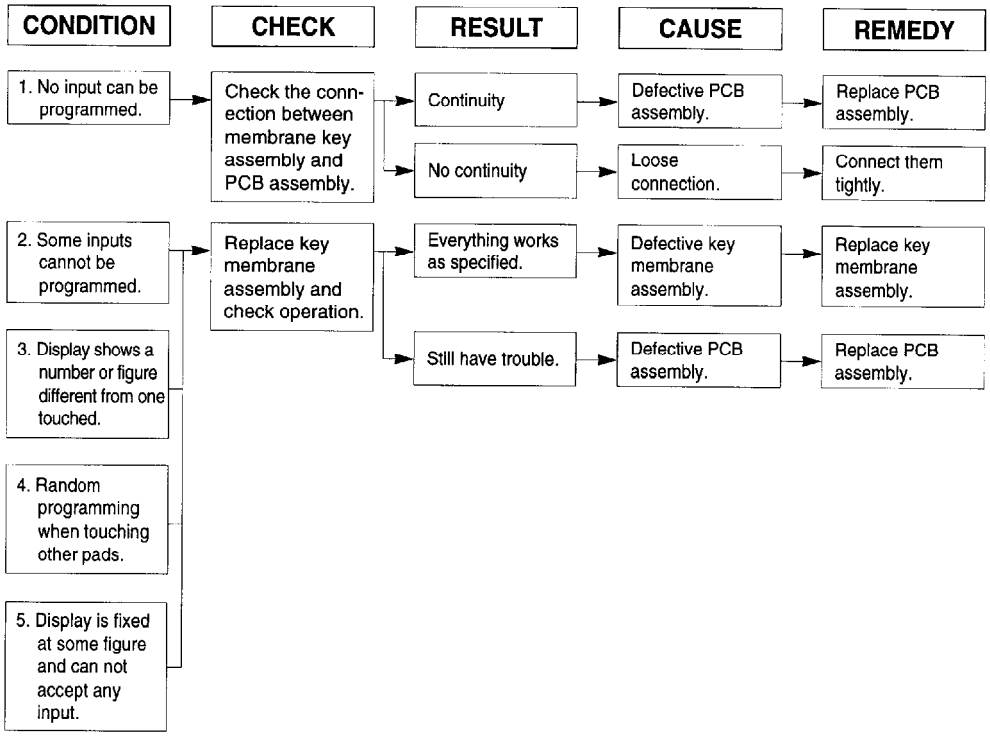
1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge the high voltage capacitor. (See page 2-1)
4. When checking the continuity of the switches or of the high voltage transformer, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
5. Do not touch any part of the circuit on the PCB since static electric discharge may damage this control panel.
   Always touch yourself ground while working on this panel to discharge any static charge built up in your body. (Micom model only)

16.2. General Troubelshooting

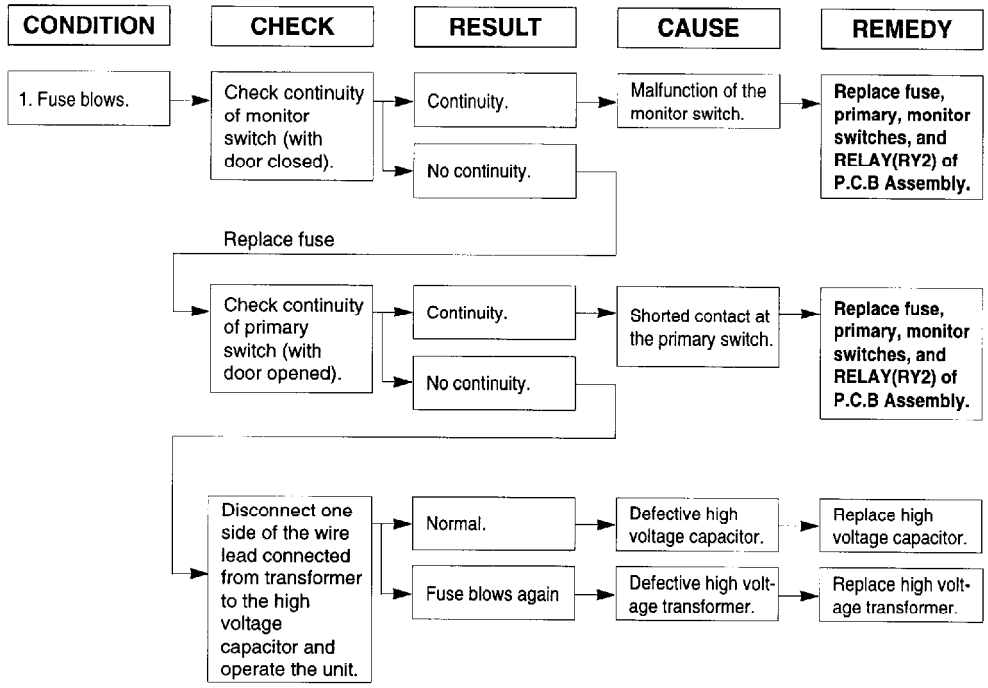
CONDITION	CAUSE	REMEDY
Microwave oven does not work.	Inserting many plug into one plug outlet and using them at the same time (blown fuse or breaker)	Avoid using other electrical appliances when you use the microwave oven.
	Microwave oven plug is not inserted tightly.	Insert microwave oven plug securely.
Output power is too low.	Low AC input voltage.	Use the microwave oven at adequate line voltage.
	Food temperature is too low.	This may not be a defect. It is possible that the food should be cooked for a longer time period.
Sparks occur.	Using metallic ware and allowing it to touch the oven wall.	Do not use metallic ware for cooking except where noted in the cooking guide.
	Ceramic ware trimmed in gold or silver power is used.	Do not use any type of cookware with metallic trimming.
Uneven cooking.	Inconsistent intensity of microwave by their characteristics.	1. Wrap the thinner part with aluminum foil 2. Use plastic wrap or lid. 3. Stir once or twice while cooking soup, cocoa or milk, etc.

16.3. (Trouble 1) The following visual conditons indicate a defective control circuit

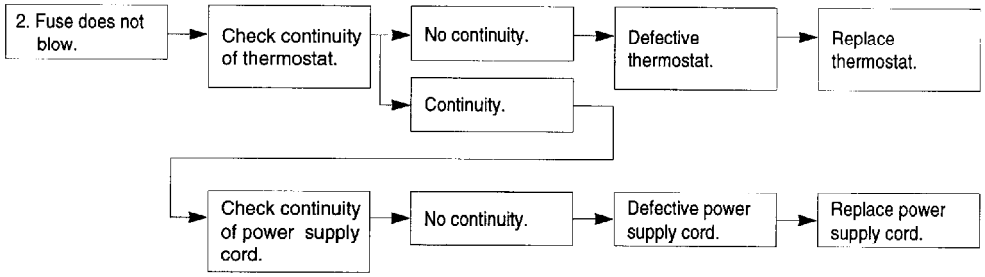
1. Incomplete segments.
   • Segment missing.
   • Partial segment missing.
   • Digit flickering (NOTE:Slight flickering is normal.)
2. Colon does not turn on or blink.
3. A distinct change in the brightness of one or more numbers in display.
4. One or more digits in the display are not lighting.
5. Display indicates a number different from one touched, for example, key in **5** and **3** appears in the display.
6. Specific numbers (for example 7 or 9) will not display when key pad is touched.
7. Display does not count down with time blinking or up with clock operation.
8. Display obviously jumps in time while counting down.
9. Display counts down too fast while cooking.
10. Each indicator light does not turn on after setting cooking cycle.
11. Display time of day does not reappear when cooking is finished.
12. Beep sound is not heard when correct key is touched.


CONDITION
CHECK
RESULT
CAUSE
REMEDY
1. No input can be programmed.
Check the connection between membrane key assembly and PCB assembly.
Continuity
Defective PCB assembly.
Replace PCB assembly.
No continuity
Loose connection.
Connect them tightly.
2. Some inputs cannot be programmed.
3. Display shows a number or figure different from one touched.
4. Random programming when touching other pads.
5. Display is fixed at some figure and can not accept any input.
Replace key membrane assembly and check operation.
Everything works as specified.
Defective key membrane assembly.
Replace key membrane assembly.
Still have trouble.
Defective PCB assembly.
Replace PCB assembly.

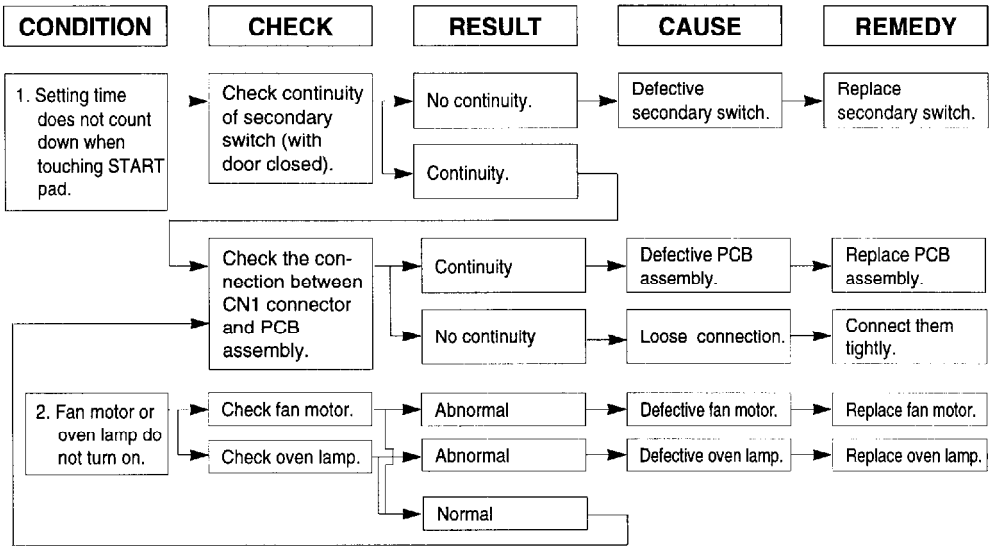
16.4. (Trouble 2) Oven does not operate at all: Display window does not display any figures, and no input is accepted.


CONDITION
CHECK
RESULT
CAUSE
REMEDY
1. Fuse blows.
Check continuity of monitor switch (with door closed).
Continuity.
Malfunction of the monitor switch.
Replace fuse, primary, monitor switches, and RELAY(RY2) of P.C.B Assembly.
No continuity.
Replace fuse
Check continuity of primary switch (with door opened).
Continuity.
Shorted contact at the primary switch.
Replace fuse, primary, monitor switches, and RELAY(RY2) of P.C.B Assembly.
No continuity.
Disconnect one side of the wire lead connected from transformer to the high voltage capacitor and operate the unit.
Normal.
Defective high voltage capacitor.
Replace high voltage capacitor.
Fuse blows again
Defective high voltage transformer.
Replace high voltage transformer.

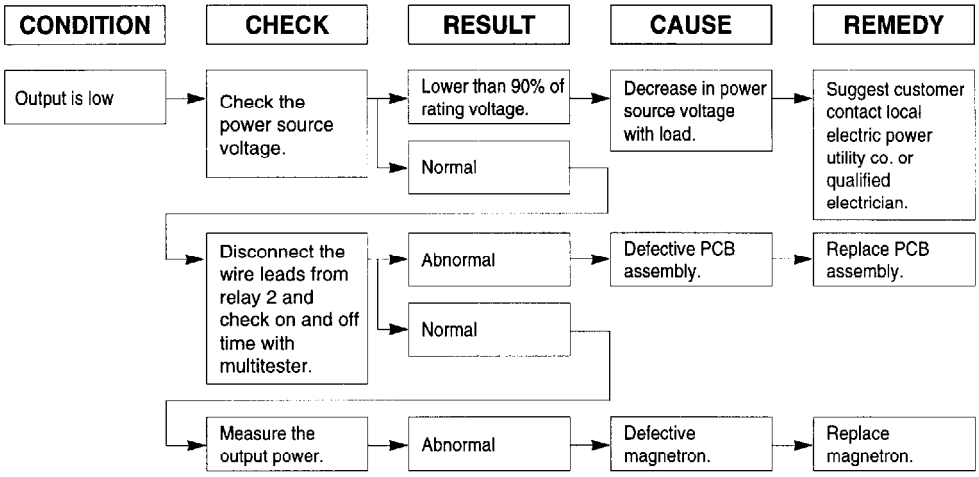
NOTE : All these switches must be replaced at the same time. Refer to page 5-6, 5-7



16.5. (Trouble 3) Display shows all figures set, but oven does not start cooking while desired program times are set and START pad is pressed.

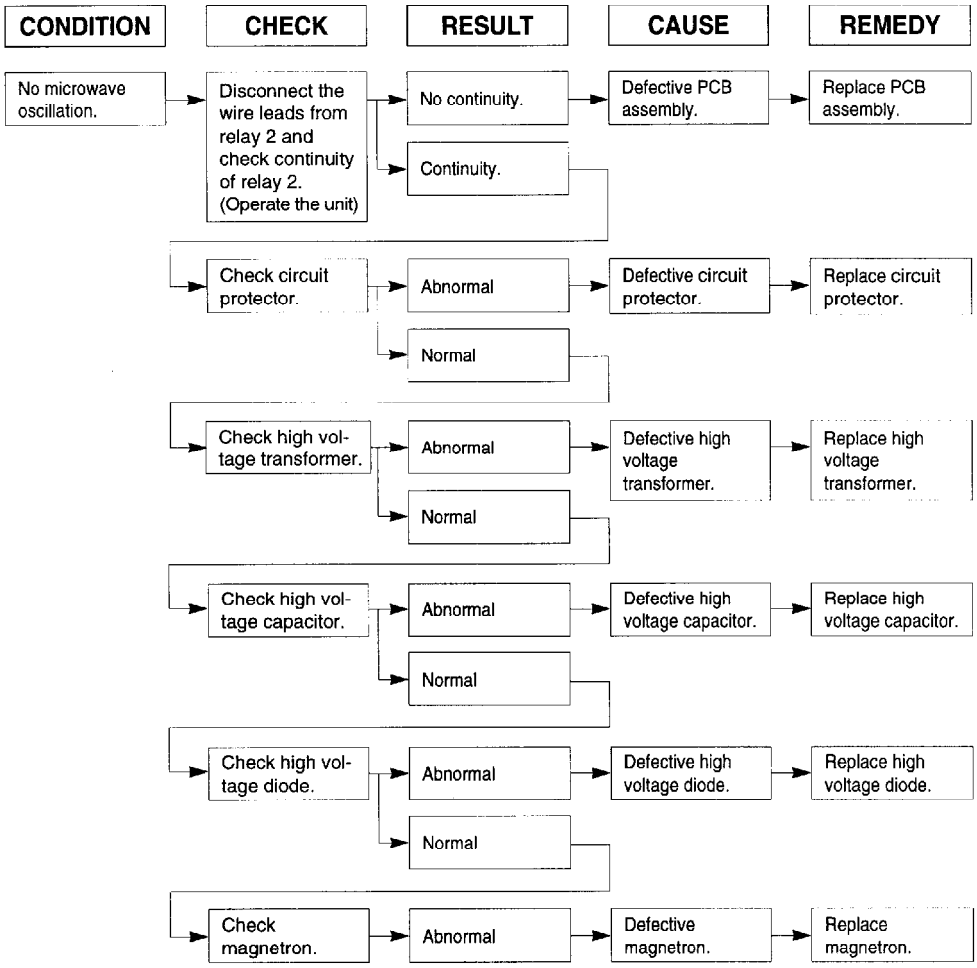


16.6. (Trouble 4) Oven seems to be operating but little heat is produced in oven load

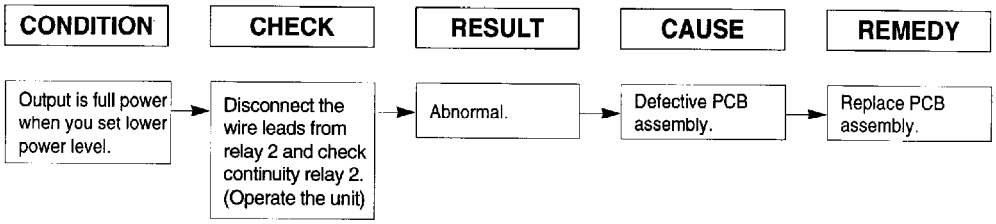


NOTE : Simple test of power output-conducted by heating one liter water for one min. if available.
Minimum 8.5°C temperature rise is normal condition.

16.7. (Trouble 5) No microwave oscialltion even though oven lamp and fan motor run. (Display operates properly)

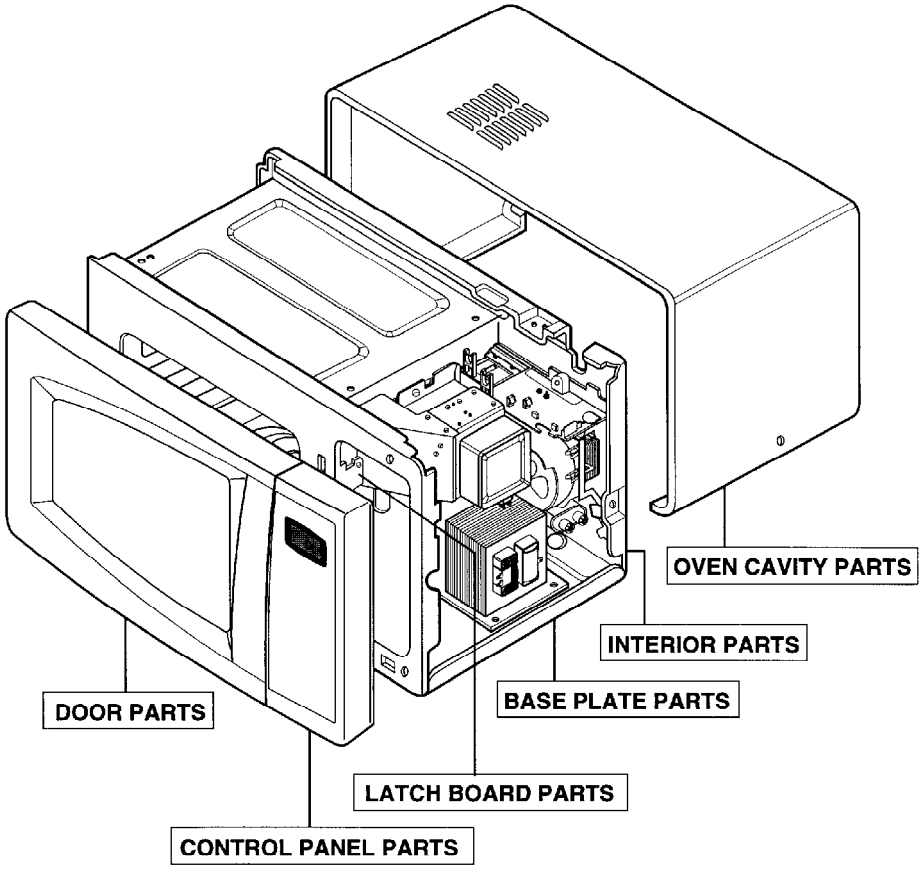


16.8. (Trouble 5) No microwave oscialltion even though oven lamp and fan motor run. (Display operates properly)

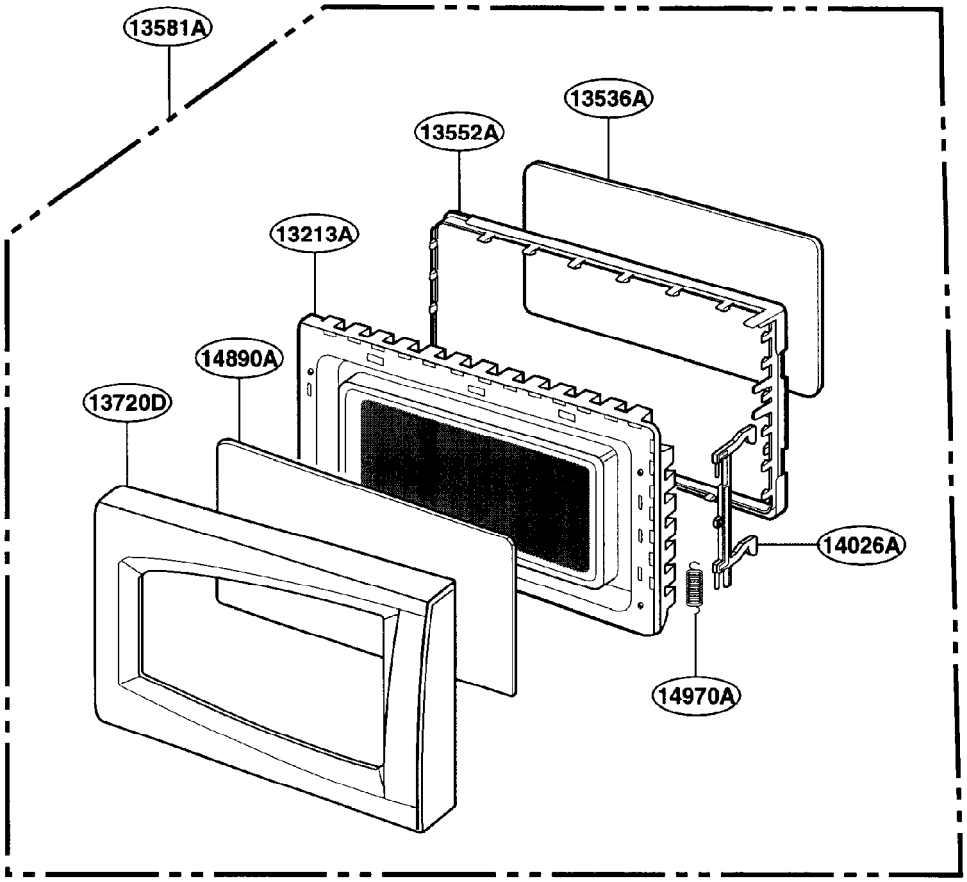


NOTE : • Make sure the wire leads correct position.
• When Removing the wire leads from the parts, be sure to grasp the connector, not the wires.
• When removing the magnetron, be sure to install the magnetron gasket in the correct position and in good condition.

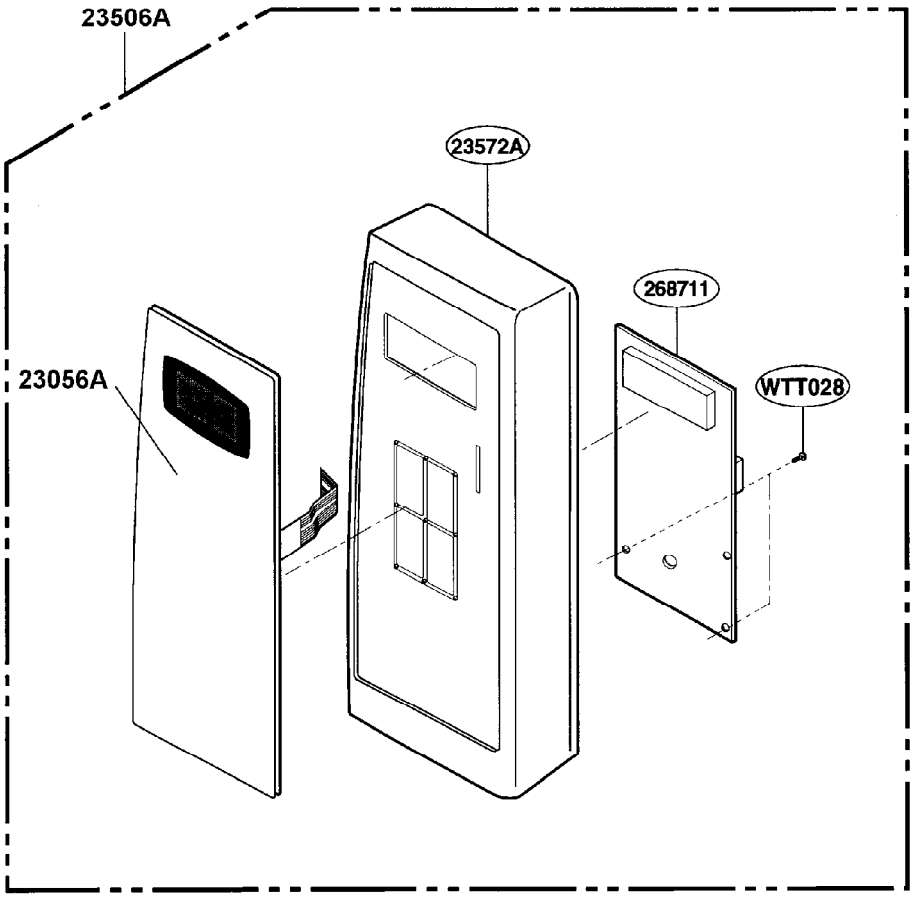
17. Exploded View (Introduction)



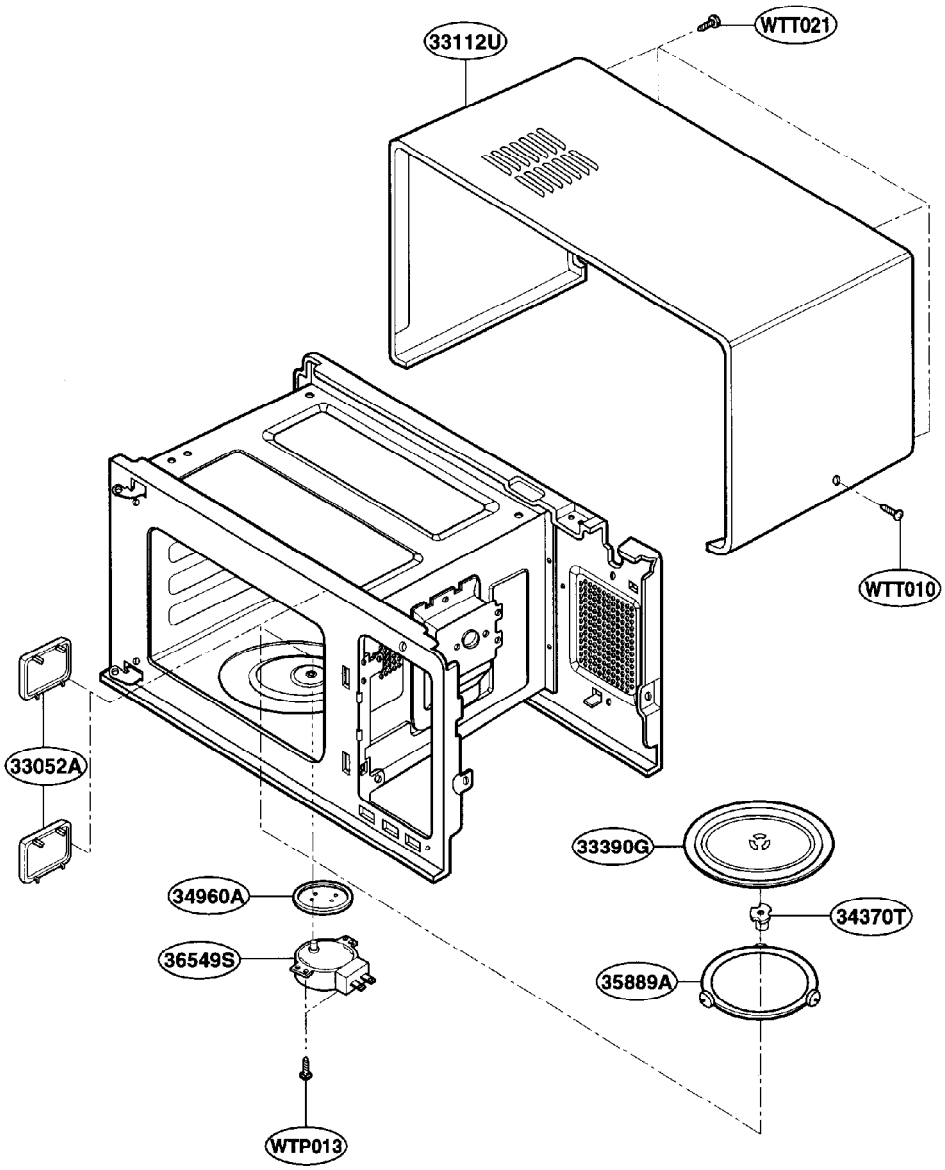
18. Exploded View (Door Parts)



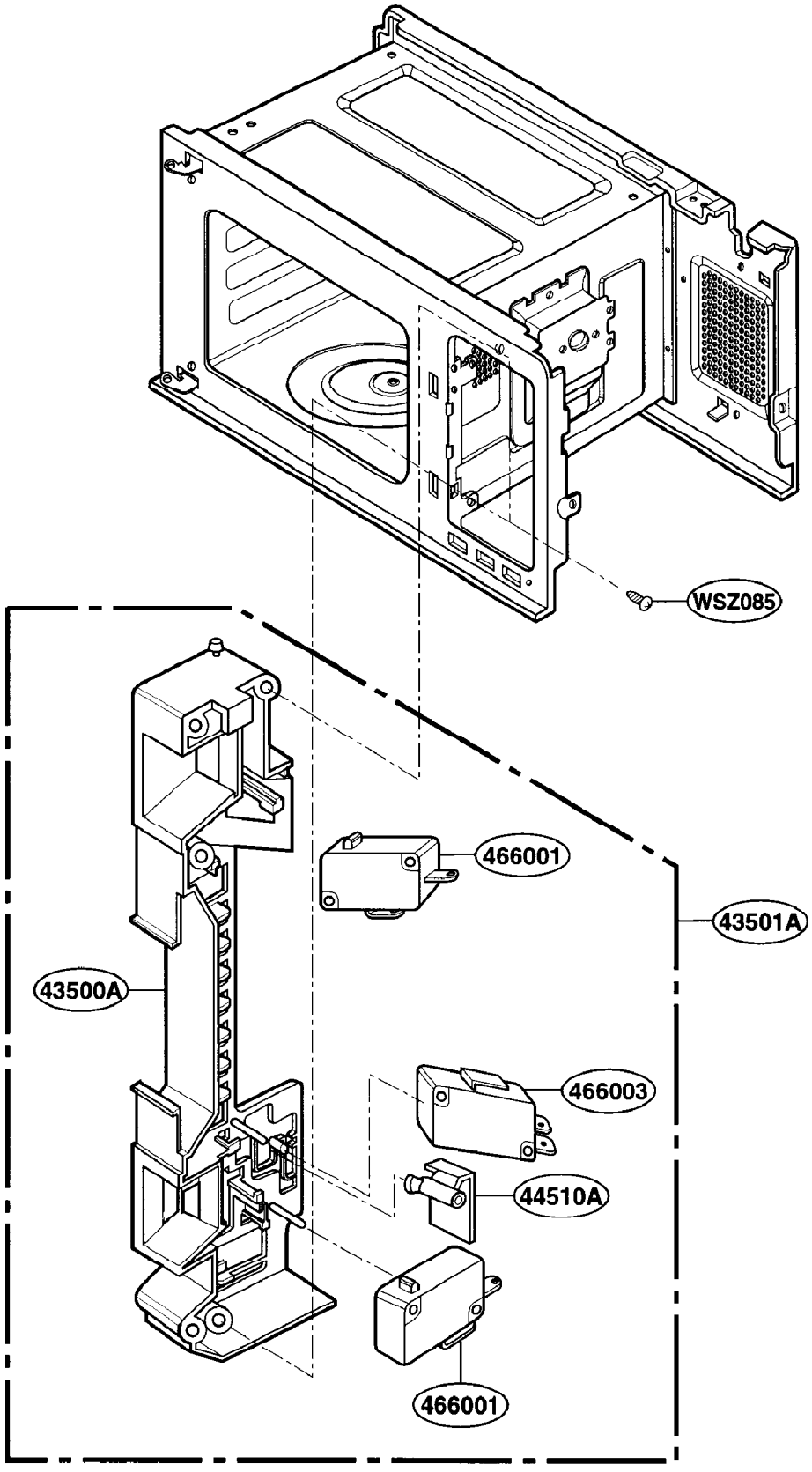
19. Exploded View (Control Panel Parts)



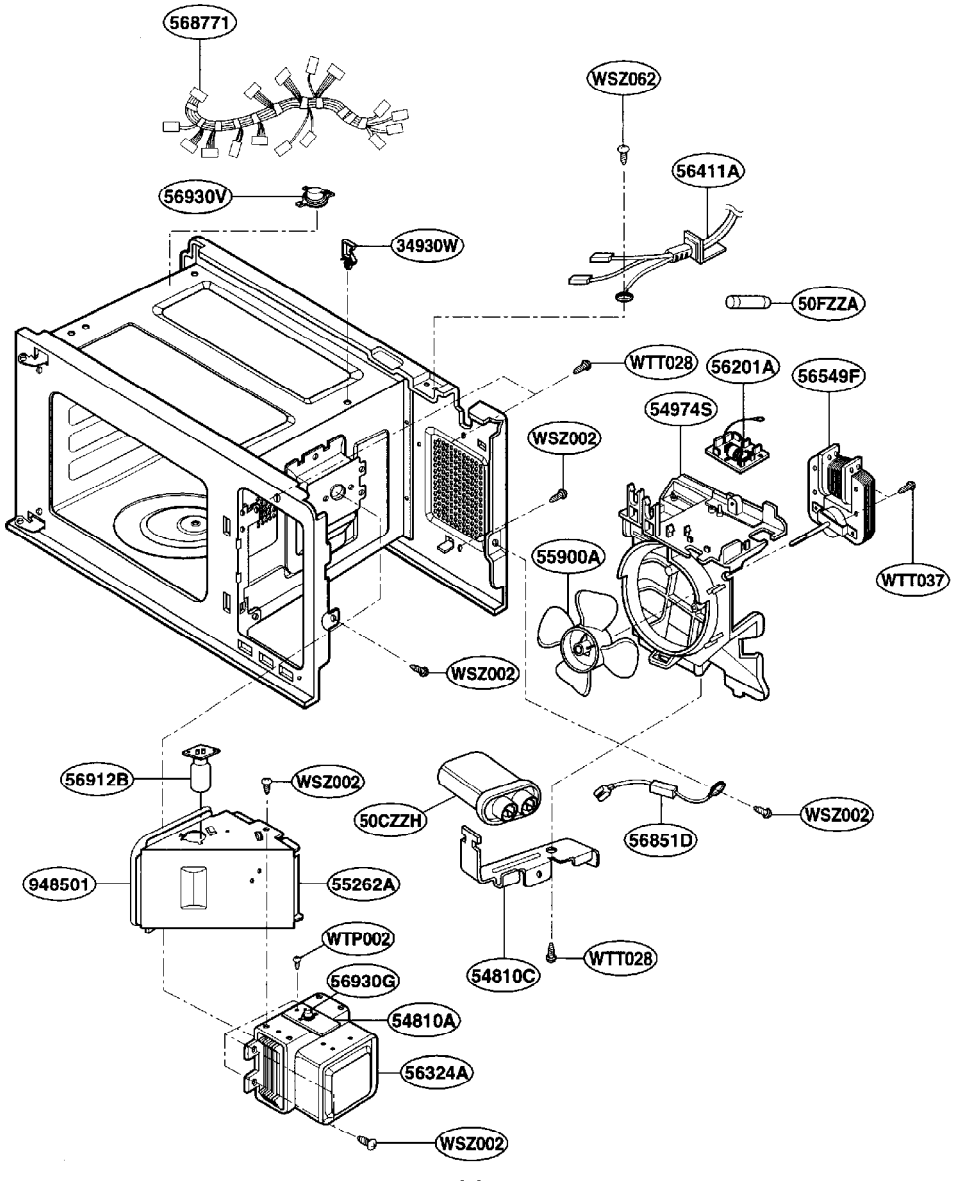
20. Exploded View (Oven Cavity Parts)



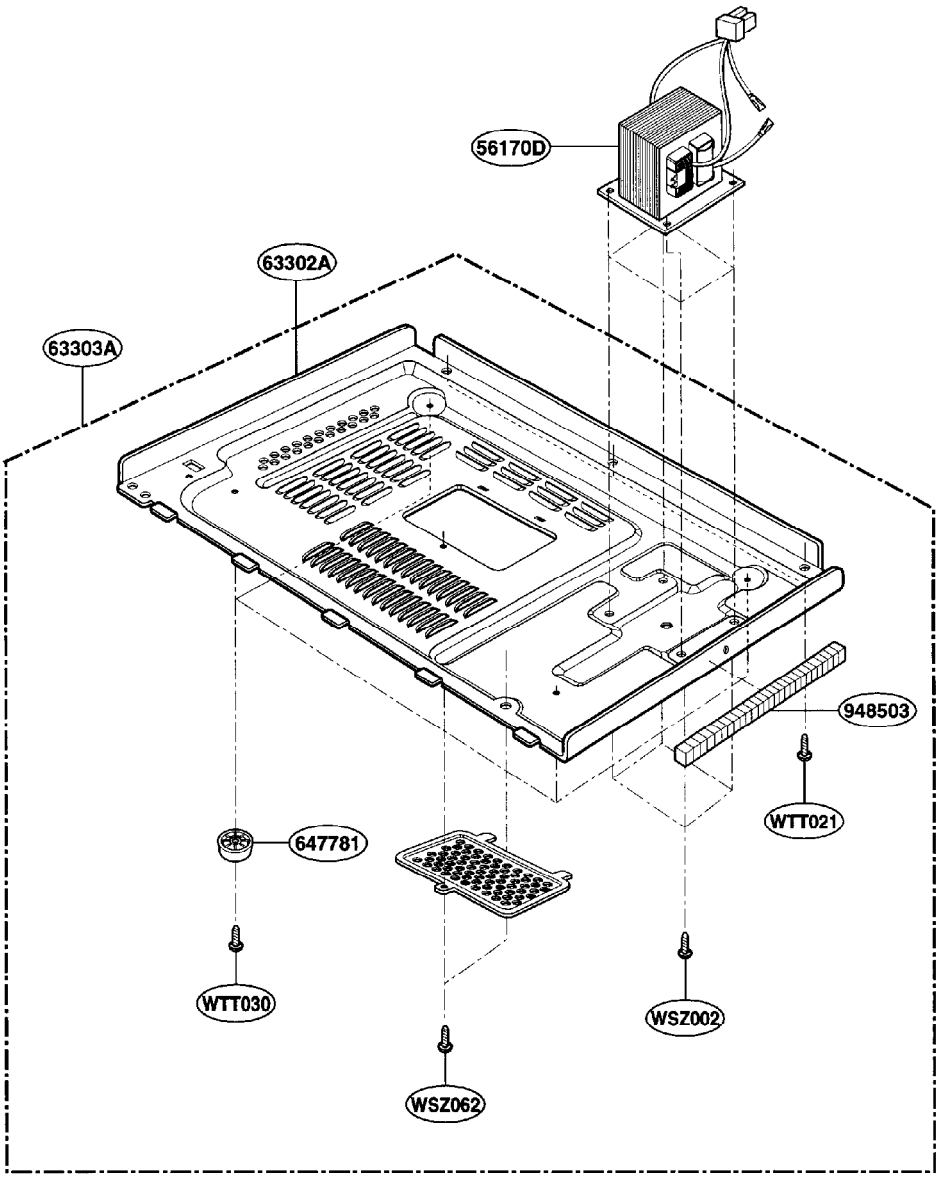
21. Exploded View (Latch Board Parts)


WSZ085
466001
43501A
43500A
466003
44510A
466001

22. Exploded View (Interior Parts)



23. Exploded View (Base Plate Parts)



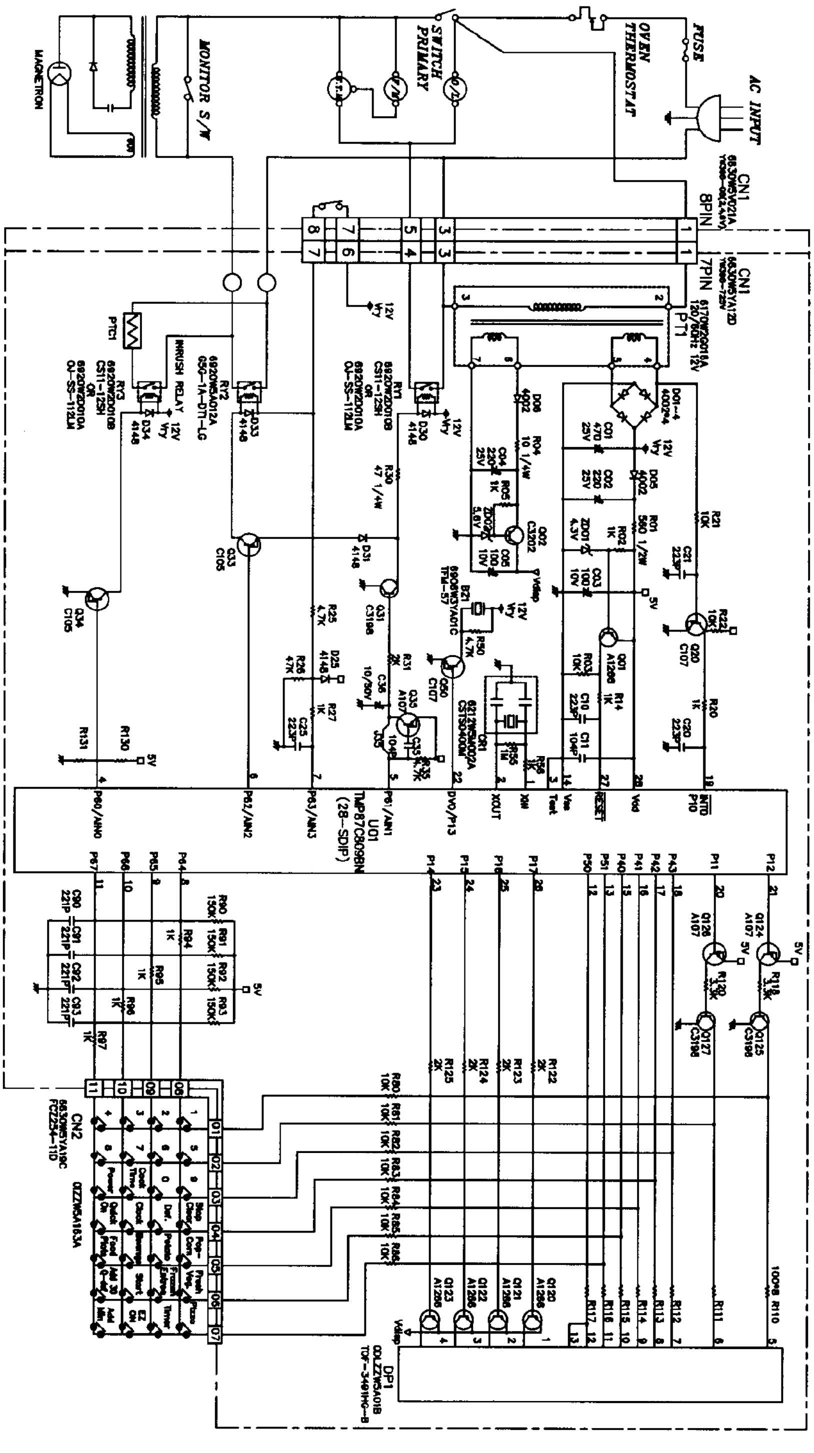
24. Replacement Parts List

24.1. For Model NN-E442WBBPQ and NN-E442WBEPG

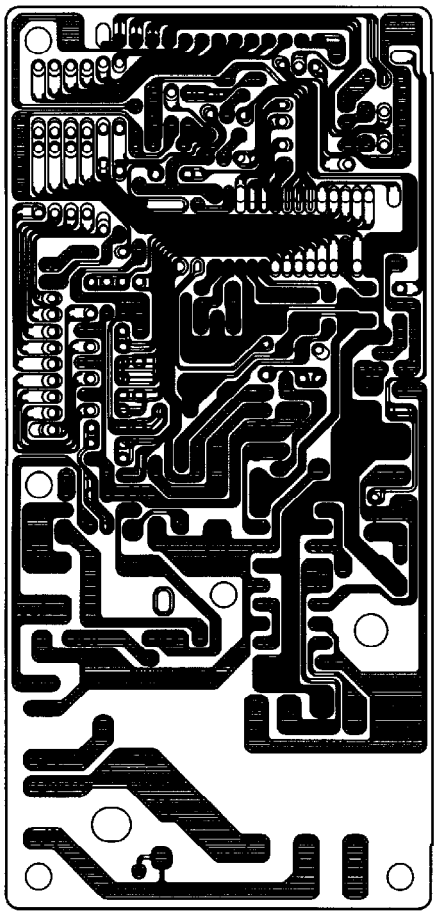
Ref. No.	Part No.	Part Name & Description	Remarks	
*01	3828W5A2491	MANUAL OWNERS	R	NN-E442WBBPQ
*01	3828W5A2492	MANUAL OWNERS	R	NN-E442WBEPG
13213A	3213W1A028B	DOOR FRAME ASSEMBLY	R ⚠	
13536A	3536WRA001L	SEAL TAPE	R	
13552A	3552W1A037A	CHOKE COVER	R	
13581A	3581W1A332A	DOOR ASSEMBLY	R ⚠	
13720D	3720W0D231A	PANEL DOOR	R	
14026A	4026W2A015A	LATCH	R	
14890A	4890W1A001J	GLASS	R	
14970A	4970WRA001C	SPRING	R	
13552A	3552W1A037A	CHOKE COVER	R	
23506A	3506W1A188A	KEY MEMBRANE	R ⚠	NN-E442WBBPQ
23506A	3506W1A188B	KEY MEMBRANE	R ⚠	NN-E442WBEPG
23572A	3720W0C015A	PANEL CONTROL	R	
24781M	4781W1M292A	CONTROLLER ASSEMBLY MICOM	R ⚠	NN-E442WBBPQ
24781M	4781W1M292B	CONTROLLER ASSEMBLY MICOM	R ⚠	NN-E442WBEPG
268711	6871W1S103D	PWB (PCB) ASSEMBLY SUB	R ⚠	NN-E442WBBPQ
268711	6871W1S103E	PWB (PCB) ASSEMBLY SUB	R ⚠	NN-E442WBEPG
33052A	3052W3A016A	CANOPY RESIN	R ⚠	
33112U	3112W1U012E	OUT CASE U-BENDING	R	
33390G	3390W1G002A	TRAY GLASS	R	1B71961A
34370T	4370W3T007A	SHAFT TURN TABLE	R	
34930W	4B72510F	HOLDER WIRE	R	
34960A	4960W3G005A	MOUNT	R	
35889A	5889W2A005J	ROTATING RING ASSEMBLY	R	
36549S	6549W1S002A	MOTOR (CIRC) SYNCHRONOUS	R ⚠	6549W1S016A
43500A	3500W1A005A	BOARDLATCH	R	
43501A	3501W1A016F	BOARD ASSEMBLY LATCH	R ⚠	
44510A	4510W4A005A	LEVER	R	
466001	3B73362F	SWITCH MICRO	R ⚠	6600W1K004C
466003	3B73361E	SWITCH MICRO	R ⚠	6600W1K004B
50CZZH	6120W3H003J	CAPACITOR DRAWING [HIGH VOLTAGE]	R ⚠	0CZZW1H002J
50FZZA	3B70856K	FUSE DRAWING	R ⚠	
54810A	4B74584A	BRACKET THERMOSTAT	R	
54810C	4810W4C003A	BRACKET CAPACITOR	R	
54974S	4974W1S010A	GUIDE SUCTION	R	
55262A	5262W2A018B	DUCT	R	
55900A	2B72125A	FAN	R	
56170D	6170W1D064A	TRANSFORMER HIGH VOLTAGE	R ⚠	
56201A	6201W2A018B	FILTER ASSEMBLY (CIRC)	R ⚠	6201W1A005A
56201B	6201W2A019A	FILTER ASSEMBLY (CIRC)	R ⚠	6201W2A019C
56324A	2B71732B	MAGNETRON	R ⚠	6324W2A003A
56411A	6411W2E001F	POWER CORD ASSEMBLY	R ⚠	NN-E442WBBPQ
56411A	2B73671K	POWER CORD ASSEMBLY	R ⚠	NN-E442WBEPG
56549F	6549W1F005A	MOTOR (CIRC) FAN	R ⚠	6549W1F007A
56851D	6021W3B001M	CABLE ASSEMBLY	R ⚠	

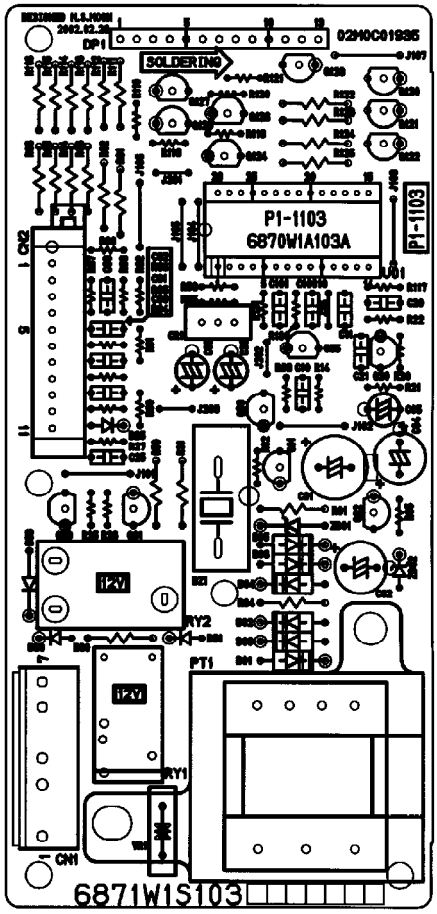
Ref. No.	Part No.	Part Name & Description	Remarks	
568771	6877W1A313C	HARNESS	R ⚠	
56912B	6912W3B002D	LAMP DRAWING	R ⚠	6912W3B002J
56930G	6930WRT003B	THERMOSTAT	R ⚠	
56930V	6930W1A001E	THERMOSTAT	R ⚠	6930WRT001A
63302A	3302W1A029A	BASE PLATE	R	
63303A	3303W1A014A	BASE PLATE ASSEMBLY	R	
647781	4B75290A	LEG	R	
948501	3B72244T	CUSHION	R	
948502	3B72244C	CUSHION	R	
948503	3B72245C	CUSHION	R	
948504	4B73438L	CUSHION	R	
948505	3B72246B	CUSHION	R	
WSZ002	1SBF0402418	SCREW TAP TITE (B) PAN HEAD	R	
WSZ062	4000W4A003A	SCREW DRAWING	R	
WSZ085	4B70188C	SCREW DRAWING	R	
WTP002	1TPL0302018	SCREW TAPPING PAN HEAD	R	
WTP013	1TPL0402418	SCREW TAPPING PAN HEAD	R	
WTP018	1TPL0402818	SCREW TAPPING PAN HEAD	R	
WTT010	1TTG0402422	SCREW TAPPING TRUSS HEAD	R	
WTT021	1TTL0402418	SCREW TAPPING TRUSS HEAD	R	
WTT028	1TTL0402818	SCREW TAPPING TRUSS HEAD	R	
WTT030	1TTL0403118	SCREW TAPPING TRUSS HEAD	R	
WTT037	1TTL0403818	SCREW TAPPING TRUSS HEAD	R	

25. Schematic Diagram Of PCB



26. Printed Circuit Board





27. PCB Parts List

Ref. No.	Part No.	Part Name & Description	Remarks	
BZ1	6908W3YA01B	BUZZER TFM-57 CW NINGBO EAST	R	6908W3YA01A
C01	0CE4776H618	CAPACITOR FIXED ELECTROLYTIC 470UF SMS SG 25V 20% FL TP 5	R	
C02	0CE2276H638	CAPACITOR FIXED ELECTROLYTIC 220UF SMS SG 25V 20% FM5 TP 5	R	
C03	0CE1076D638	CAPACITOR FIXED ELECTROLYTIC 100UF SMS SG 10V 20% FM5 TP 5	R	
C04	0CE2276H638	CAPACITOR FIXED ELECTROLYTIC 220UF SMS SG 25V 20% FM5 TP 5	R	
C05	0CE1076D638	CAPACITOR FIXED ELECTROLYTIC 100UF SMSSG 10V 20% FM5 TP 5	R	
C10	0CK2230K948	CAPACITOR FIXED CERAMIC 22NF D 50V 80%-20% F (Y5V) TA26	R	
C11	0CK1040K948	CAPACITOR FIXED CERAMIC 0.1UF D 50V 80%-20% F (Y5V) TA26	R	
C20	0CK2230K948	CAPACITOR FIXED CERAMIC 22NF D 50V 80%-20% F (Y5V) TA26	R	
C21	0CK2230K948	CAPACITOR FIXED CERAMIC 22NF D 50V 80%-20% F (Y5V) TA26	R	
C25	0CK2230K948	CAPACITOR FIXED CERAMIC 22NF D 50V 80%-20% F (Y5V) TA26	R	
C90	0CK2210K518	CAPACITOR FIXED CERAMIC 220PF D 50V 10% B (Y5P) TA26	R	
C91	0CK2210K518	CAPACITOR FIXED CERAMIC 220PF D 50V 10% B (Y5P) TA26	R	
C92	0CK2210K518	CAPACITOR FIXED CERAMIC 220PF D 50V 10% B (Y5P) TA26	R	
C93	0CK2210K518	CAPACITOR FIXED CERAMIC 220PF D 50V 10% B (Y5P) TA26	R	
CN1	6630W5YA12D	CONNECTOR (CIRC) WAFER YW396-725V YEONHO 7P 3.96MM	R	
CN2	6630W5V017B	CONNECTOR (CIRC) WAFER JE501S JAE EUN 11P 2.54MM WAFER	R	6630W5YA19C
CU1	4850W4C001G	CUSHION 7T 10W 35L SPONGE	R	
D01	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D02	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D03	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D04	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D05	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D06	0DD400209AA	DIODE RECTIFIERS 1N4002 PYUNG CHANG TP26 DO41	R	
D25	0DD414809AB	DIODE SWITCHING 1N4148M PYUNG CHANG TP26 DO34	R	
D30	0DD414809AB	DIODE SWITCHING 1N4148M PYUNG CHANG TP26 DO34	R	
D31	0DD414809AB	DIODE SWITCHING 1N4148M PYUNG CHANG TP26 DO34	R	
DP1	0DLZZW5A01C	LED WAICHI WD061A-01 BK GREEN 100	R	0DLZZW5A01B
PT1	6170W2G016H	TRANSFORMER POWER 220-230V 50HZ 97MA/12V LGECW	R	
Q01	0TRAU90018A	TRANSISTOR BIPOLARS AUK KOREA 2SA1980G-AT TP TO92M	R	0TR126609AA
Q02	0TRAU90017B	TRANSISTOR BIPOLARS AUK KOREA 2SC5342Y-AT TP TO92M	R	0TR320209BA
Q120	0TRAU90018A	TRANSISTOR BIPOLARS AUK KOREA 2SA1980G-AT TP TO92M	R	0TR126609AA
Q121	0TRAU90018A	TRANSISTOR BIPOLARS AUK KOREA 2SA1980G-AT TP TO92M	R	0TR126609AA
Q122	0TRAU90018A	TRANSISTOR BIPOLARS AUK KOREA 2SA1980G-AT TP TO92M	R	0TR126609AA
Q123	0TRAU90018A	TRANSISTOR BIPOLARS AUK KOREA 2SA1980G-AT TP TO92M	R	0TR126609AA

Ref. No.	Part No.	Part Name & Description	Remarks	
Q124	0TRAU90014A	TRANSISTOR BIPOLARS AUK KOREA SRA2207M-AT TP TO92M	R	0TR107009AE
Q125	0TRAU90019A	TRANSISTOR BIPOLARS AUK KOREA 2SC5343G-AT TP TO92M	R	0TR319809AA
Q126	0TRAU90014A	TRANSISTOR BIPOLARS AUK KOREA SRA2207M-AT TP TO92M	R	0TR107009AE
Q127	0TRAU90019A	TRANSISTOR BIPOLARS AUK KOREA 2SC5343G-AT TP TO92M	R	0TR319809AA
Q20	0TRAU90015A	TRANSISTOR BIPOLARS AUK KOREA SRC1207M-AT TP TO92M	R	0TR107009AD
Q31	0TRAU90019A	TRANSISTOR BIPOLARS AUK KOREA 2SC5343G-AT TP TO92M	R	0TR319809AA
Q33	0TRAU90013A	TRANSISTOR BIPOLARS AUK KOREA SRC1205M-AT TP TO92M	R	0TRFC90001A
Q50	0TRAU90015A	TRANSISTOR BIPOLARS AUK KOREA SRC1207M-AT TP TO92M	R	0TR107009AD
R01	0RK5600A608	RESISTOR FIXED METAL OXIDE 560 OHM 1/2 W(7.0) 5% TA26	R	
R02	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R03	0RD1002F608	RESISTOR FIXED CARBON FILM 10K OHM 1/6 W 5% TA26	R	
R04	0RD0102G608	RESISTOR FIXED CARBON FILM 10 OHM 1/4 W 5% TA26	R	
R05	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R110	0RD1000F608	RESISTOR FIXED CARBON FILM 100 OHM 1/6 W 5% TA26	R	
R111	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R112	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R113	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R114	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R115	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R116	0RD1000G608	RESISTOR FIXED CARBON FILM 100 OHM 1/4 W 5% TA26	R	
R117	0RD1000F608	RESISTOR FIXED CARBON FILM 100 OHM 1/6 W 5% TA26	R	
R122	0RD2001G608	RESISTOR FIXED CARBON FILM 2K OHM 1/4 W 5% TA26	R	
R123	0RD2001G608	RESISTOR FIXED CARBON FILM 2K OHM 1/4 W 5% TA26	R	
R124	0RD2001G608	RESISTOR FIXED CARBON FILM 2K OHM 1/4 W 5% TA26	R	
R125	0RD2001G608	RESISTOR FIXED CARBON FILM 2K OHM 1/4 W 5% TA26	R	
R130	0RD3302F608	RESISTOR FIXED CARBON FILM 33K OHM 1/6 W 5% TA26	R	
R131	0RD1202F608	RESISTOR FIXED CARBON FILM 12K OHM 1/6 W 5% TA26	R	
R14	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R20	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R21	0RD1002F608	RESISTOR FIXED CARBON FILM 10K OHM 1/6 W 5% TA26	R	
R22	0RD1002F608	RESISTOR FIXED CARBON FILM 10K OHM 1/6 W 5% TA26	R	
R25	0RD4701F608	RESISTOR FIXED CARBON FILM 4.7K OHM 1/6 W 5% TA26	R	

Ref. No.	Part No.	Part Name & Description	Remarks	
R26	0RD4702F608	RESISTOR FIXED CARBON FILM 47K OHM 1/6 W 5% TA26	R	
R27	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R30	0RD0472G608	RESISTOR FIXED CARBON FILM 47 OHM 1/4 W 5% TA26	R	
R31	0RD2001G608	RESISTOR FIXED CARBON FILM 2K OHM 1/4 W 5% TA26	R	
R50	0RD4701G608	RESISTOR FIXED CARBON FILM 4.7K OHM 1/4 W 5% TA26	R	
R55	0RD1004F608	RESISTOR FIXED CARBON FILM 1M OHM 1/6 W 5% TA26	R	
R80	0RD1002F608	RESISTOR FIXED CARBON FILM 10K OHM 1/6 W 5% TA26	R	
R81	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R82	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R83	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R84	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R85	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R86	0RD1002G608	RESISTOR FIXED CARBON FILM 10K OHM 1/4 W 5% TA26	R	
R90	0RD1503F608	RESISTOR FIXED CARBON FILM 150K OHM 1/6 W 5% TA26	R	
R91	0RD1503F608	RESISTOR FIXED CARBON FILM 150K OHM 1/6 W 5% TA26	R	
R92	0RD1503F608	RESISTOR FIXED CARBON FILM 150K OHM 1/6 W 5% TA26	R	
R93	0RD1503F608	RESISTOR FIXED CARBON FILM 150K OHM 1/6 W 5% TA26	R	
R94	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R95	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R96	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
R97	0RD1001F608	RESISTOR FIXED CARBON FILM 1K OHM 1/6 W 5% TA26	R	
RY1	6920W2D010A	RELAY OJ-SS-112LM OEG 250VAC 3A	R	6920WRD008A
RY2	6920W5A012A	RELAY G5G-1A-DT1-LG OMRON 250VAC	R	
U01	0IZZW5A174A	IC DRAWING TMP87C809BN 28-SDIP BK	R	
ZD01	0DZ430009CC	DIODE ZENERS UZ4.3B PYUNG CHANG TP26 DO34	R	
ZD02	0DZ560009AC	DIODE ZENERS UZ-5.6BS PYUNG CHANG TP26 DO34	R	